



Executive Summary

- Scientific Learning Corporation was founded by scientists who successfully applied neuroscience principles to accelerate learning in students of various ages – from preschool to adults. Their work confirmed the concept of lifelong brain plasticity – that the brain can reinvent and reconfigure itself throughout life and not just during the formative years.
- Nearly 6,000 U.S. schools have implemented Scientific Learning’s Fast ForWord® family of software products, which applies “Brain Fitness” principles to the areas of language and reading. Using Fast ForWord, students from pre-K to post-secondary levels have realized achievement gains of one to two years in as little as 8-12 weeks and have maintained an accelerated rate of learning even after the program ended.
- Evidence of improved learning outcomes following the application of neuroscience theories may be found in the 200+ studies that have evaluated the effectiveness of Fast ForWord programs. Populations impacted include English language learners, struggling readers and special education students, as well as students performing at grade level and above.
- Education policy conversations have focused on quality teaching and research-based content, but have failed to recognize weaknesses in foundational learning skills such as attention, memory and processing rate. The scientific community has demonstrated that these cognitive challenges of varying severity in the brain of each learner can be overcome using highly scalable and replicable technology-based approaches.
- Given the promise of new advances in brain plasticity research and the emergence of cognitive skill development programs, it is imperative that legislators, education officials and community leaders understand, emphasize and support the application of neuroscience research aimed at improving student achievement and U.S. global competitiveness.
- Scientific Learning is prepared to help facilitate and inform such conversations and policies at the national, state and local levels in a variety of ways. Areas in which we can assist include providing neuroscience expertise for hearings and briefings before Congress as well as suggesting language for education standards or grants that can leverage or build upon these important scientific findings.



About Scientific Learning

Scientific Learning Corporation, a public company of approximately 200 employees headquartered in Oakland, California, applies more than 30 years of cognitive research and advances in neuroscience to accelerate learning in students of various ages – from preschool to adults. The company initially developed products for use by licensed specialists in private clinics where students with specific learning difficulties utilized Scientific Learning software as a component of intervention services.

In recent years, Scientific Learning expanded its product portfolio to strengthen brain processes and build literacy skills for all students in grades pre-K to post-secondary. Scientific Learning's Fast ForWord family of products has been implemented in nearly 6,000 elementary, middle and high schools across the United States and is widely recognized for its ability to help struggling students achieve a one to two year reading gain in as little time as 8 to 12 weeks.

The Fast ForWord programs trace their origins to the work of Scientific Learning's founding scientists, Drs. Michael Merzenich and William Jenkins (University of California, San Francisco), and Drs. Paula Tallal and Steven Miller (Rutgers University). Collectively, these four neuroscientists and cognitive researchers are responsible for the company's portfolio of 80+ patents in neuroscience and education.

How important is “Brain Fitness” to successful learning?

In our national effort to close the achievement gap in schools, conversations have focused primarily upon curriculum standards and strategies for individualizing instruction to give students optimal and repeated exposure to content they haven't mastered. While these objectives are critically important, they do not directly address the needs of students that have difficulty paying attention to instruction or remembering what they are taught. They also do not address a cognitive challenge faced by nearly every student from English language learners or struggling students to learners at grade level and above – the inability to process information in one or more subject areas as quickly as it is being presented. The loss of confidence that follows these difficulties can negatively impact student motivation and harm overall academic performance.

The latest neuroscience has shown that, unlike earlier claims that the brain is relatively fixed after early childhood, the brain is actually modified on a substantial scale, both physically and functionally, each time we learn a new skill or develop a new ability. This benefit of brain plasticity lasts throughout our lifetimes. Just as exercise of the body promotes physical fitness, so does proper exercise of the mind promote “Brain Fitness” in the areas of sequencing, processing rate, attention and recall. Such cognitive exercises enable learners to accelerate their acquisition of knowledge, to better utilize and organize information to which they have already been exposed, and to embark upon an improved trajectory of lifelong learning. Together, brain fitness activities and good instructional practices can create an optimal learning environment where every child, adolescent and adult can reach his or her full potential.

What evidence suggests a positive learning impact from combining “Brain Fitness” exercises with curriculum?

Two functional magnetic resonance imaging (fMRI) studies (one at Stanford and one at Harvard) showed the normalization of brain activity for dyslexic children in critical reading areas following the use of Fast ForWord Language. The studies showed that these physiological changes coincided with demonstrated improvements in reading and language skills. Another 200+ studies have been conducted on the efficacy of Fast ForWord programs, varying from small, school-based evaluations to independent studies that meet the highest standards of research as defined by the What Works Clearinghouse within the U.S. Department of Education. Overall, these various evaluations have clearly indicated that combining brain fitness exercises with a strong, standards-based curriculum can yield dramatic and enduring improvements in academic achievement. Full research reports may be found on the Scientific Learning public website (<http://www.scilearn.com/results>). Recent and notable field studies include:

- A four-year longitudinal study in Dallas ISD, where struggling students used the Fast ForWord family of products. Students who used the products made significant improvements on their Texas Assessment of Knowledge and Skills (TAKS) scores and narrowed the achievement gap by more than 25%. The improved learning trajectory of these students continued during the two years following Fast ForWord participation.
- Strong gains on the Louisiana Educational Assessment Program (LEAP) and the Integrated Louisiana Educational Assessment Program (iLEAP) for Fast ForWord student users in the St. Mary Parish School District. At one school, within two years of starting to use the Fast ForWord products, the number of 4th graders scoring Basic or above in Reading increased from 19% to 81%, and the number scoring Basic or above in math increased from 9% to 71%
- A Davenport, Iowa randomized comparison trial where 3 to 5 year-old children using Fast ForWord products showed greater gains (with statistical significance) than the control group. The group that used the products improved from the 36th percentile to the 59th percentile on the Pre-school Language Scales test (PLS-4) in six months.
- Scalable success in Duval County, Florida, where the impact of Fast ForWord software on more than 23,000 students demonstrated that combining proven neuroscience principles with highly replicable technology can positively impact the reading skills of large populations of students in a short period of time

The importance of brain research and brain fitness in education is also at the forefront of today’s science and technology discussions in the media. Public television stations across the country are currently airing a documentary entitled *The New Science of Learning: Brain Fitness for Kids*, which explores brain plasticity and how it can be applied to boost learners of all ability levels. Recently, *US News & World Report* (May 2009) published a special issue focusing on the mysteries of science, including brain research and new breakthroughs in education programs that build brain fitness.



What can education leaders and policymakers in the United States do to better leverage neuroscience and cognitive research and improve learning outcomes?

All of us agree that the future of our country depends upon our ability to successfully educate our children and young adults so that they can compete globally. Research has shown that brain fitness along with good teaching and content can close the achievement gap. Bringing educators, scientists, and education policymakers together to discuss brain fitness and its impact on learning and its connection to K-12 curriculum standards is a possible first step in helping struggling learners and elevating student achievement nationwide. Our neuroscientists are prepared to share this evidence and expertise in hearings and briefings before Congress.

But the need for improved learning does not end in the 12th grade. We have applied the principles of neuroscience to enable students to be more successful in post-secondary education, which can result in a more productive adult community. As demonstrated in Scientific Learning's early results from English learning centers around the world, brain fitness exercises can also improve the speed and efficiency of language training. An investment in brain fitness programs for the men and women of our armed forces may enhance their efforts in the service while helping them succeed in concurrent education programs or prepare for future civilian careers.

Legislators, education officials and community leaders hold the keys to bringing these dramatic, positive changes to learning. They can emphasize the impact of combining cognitive skill development with content area mastery in national standards of learning, they can provide funding for grants that connect the power of these two disciplines, and they can recognize that the "Race to the Top" can be best achieved in districts that include a proven brain fitness component within their proposals.

Now is our great moment of responsibility to understand and emphasize these proven and innovative approaches, which hold the promise of establishing the pre-eminence of U.S. education in the world and enhancing future prospects for many generations of Americans.