

A large, intricate network diagram composed of numerous dark red circular nodes of varying sizes, interconnected by thin, dark red lines. This graphic serves as a background for the entire page, symbolizing a complex web of connections or neural pathways.

MAPPING THE MIND

The Science Behind Reading Success

A Special Report from the Makers of *READ 180*

SCIENCE HAS SHOWN US HOW TO BUILD READING PROFICIENCY.

We also now understand that social-emotional learning is key to academic success. How can we use this knowledge to support the learners who need the most help?

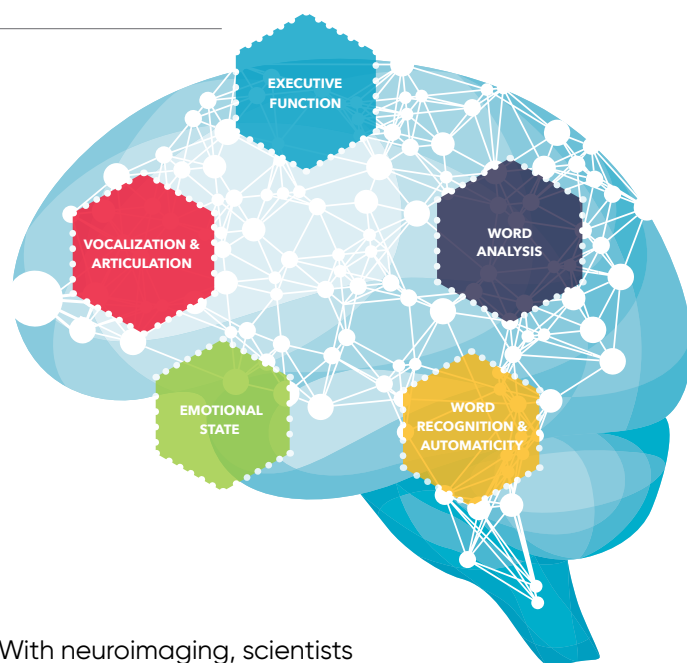
All students can learn, but each one follows a different path to achievement. In every classroom, a teacher faces the challenge of addressing a multitude of students' needs while helping each individual learner reach the end goal: reading proficiency. The challenge is even greater when there are some students who are falling behind because they have learning disabilities or are contending with a language barrier.

These challenges are hardly new. However, the learning landscape has changed over the past several decades. The methods available to educators to support students have evolved, as researchers have made great strides in terms of understanding the human brain and what happens within it as a student learns.

INSIDE THE READING BRAIN

Science is the key to unlocking reading potential. Ted Hasselbring, a leading researcher on learning technology and a former special education teacher, has conducted extensive studies on the use of adaptive technology to personalize and enhance learning. His work has helped to break the failure cycle for millions of students.

"It's amazing what we can do now—the technology, and being able to do scans of the brain while people are learning and seeing which parts are being used and how they're being used," Hasselbring says.



With neuroimaging, scientists are able to map areas of the brain, highlighting the interweaving of language, word-recognition, and executive-function skills and the social-emotional state.

Scientists have identified five principles that explain the relationship between students' brains and the task of learning to read:

01 The brain forms new circuits for written language from older genetic processes like vision, language, cognition, and emotional systems.

02 The development of these circuits depends on the language environment and the particular writing system.

03 Neurons are reprogrammed to form the reading circuits.

04 The more readers know about words and about how words function within sentences and stories, the faster a reading circuit is strengthened.

05 Reading is ultimately about going beyond the text to make connections to one's experiences and thoughts.

Researchers have also found that comprehending text involves separate processes, including perceiving words, identifying text structures, and understanding the relationships between characters in a story. In addition, when a student reads about an action or emotion, the student's brain activity is consistent with what would happen if he or she were actually experiencing that action or emotion. For example, when a student reads about a character riding a bike, the parts of the brain responsible for helping the student ride a bike are activated.

Furthermore, we now know that activation patterns in the brains of proficient readers and striving readers differ dramatically. The reading circuits in the brains of striving readers are more scattered and less established than in the brains of proficient readers. But experts have determined that intensive instruction in—and deliberate practice of—reading skills and strategies can change the way that striving readers' brains work.

STRATEGIES FOR STUDENT SUCCESS

We now have an understanding of certain learning connections relevant to all students, including those with disabilities and English learners. For example, we know that **speech/sound blending**, as well as an **understanding of morphology**, support word recognition. **Spelling** supports vocabulary. **Oral language capacities** are the underpinning for written language.

We also know that **differentiated instruction** is particularly important for reading proficiency, as matching instruction to meet each student's assessed needs has been shown to significantly improve student achievement. **Individually targeted instruction** in reading skills can improve both the targeted skill and more generalized areas of literacy.

Additionally, research has shown that whole-group instruction does not adequately meet

the individual needs of students who need extra literacy support. Instead, teachers are encouraged to use performance data to form **small groups** of students and teach lessons targeting their specific skill needs. Students with disabilities have been shown to benefit from this type of targeted, intensive instruction.

As targeted instruction meets the needs of individual students, it is recommended that teachers maintain **high expectations and rigor** for those students. Teachers are also encouraged to **stimulate student agency** and empower their students by giving them the ability to monitor their own progress and self-regulate. Put simply, student choice motivates learning.

While these strategies support all students, they can be life changing for those with a learning disability, as well as students who are English learners (ELs).

ADDRESSING STUDENT DISABILITIES

Between 2011–12 and 2015–16, the number of students ages 3–21 who received special education services increased from 6.3 million to 6.7 million. Students who receive special education services are those who have been identified as having a disability that adversely affects academic performance.

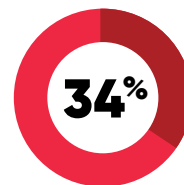
U.S. Special Education Students Ages 3–21, 2015–16

6.7
MILLION

SOURCE: National Center for Education Statistics



13% OF THE ENTIRE
PUBLIC SCHOOL
STUDENT POPULATION



34% HAD SPECIFIC
LEARNING DISABILITIES

AN ESTIMATED 80% OF STUDENTS WITH SPECIFIC LEARNING DISABILITIES HAVE A PRIMARY DISABILITY IN READING

SOURCE: International Dyslexia Association (IDA), 2007

A **specific learning disability** is a disorder in one or more of the basic psychological processes involved in understanding or using language, spoken or written. Such a disorder may manifest itself in an impaired ability to listen, think, speak, read, write, spell, or do mathematical calculations.

For students with disabilities, **performance assessment data** is essential to monitor their progress and determine ongoing instructional/remedial needs.

Dyslexia, a language-based disability that affects both oral and written language, may also be referred to as a reading disability. Students with dyslexia most commonly experience difficulties in the areas of decoding, spelling, communicating ideas through writing, and reading comprehension.



Jessie, a sixth-grader in Florida, was diagnosed with dyslexia and has been reading and writing far below her grade level. She often does not understand the words she sees, and struggles to keep up with her peers. Jessie frequently has to bring her schoolwork home with her because she is unable to complete it on time in class.

For Jessie, and students facing similar challenges, research shows that effective intervention programs:

Additionally, help with handwriting, spelling, and sentence composition has been shown to support higher-level composition.

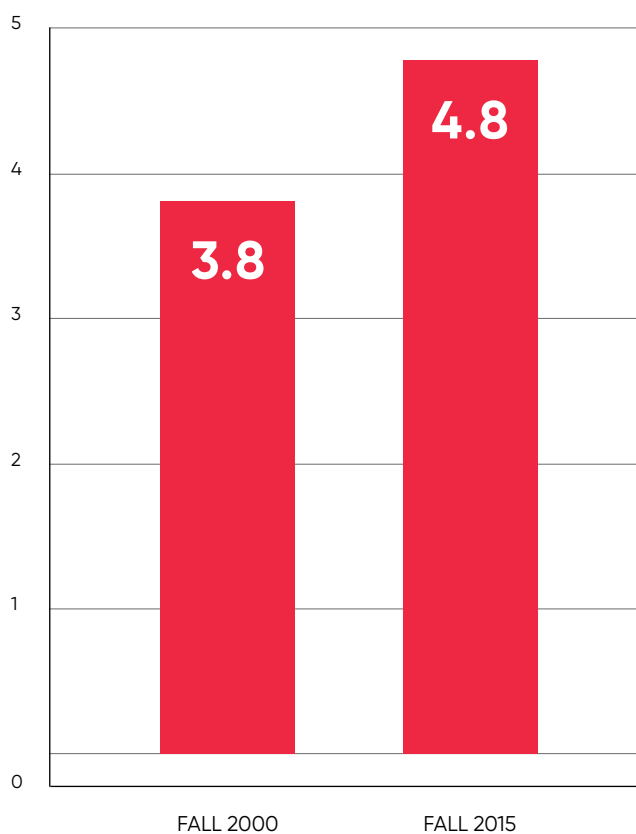
According to the International Dyslexia Association, interventions should be systematic, explicit, and multisensory. Many students with dyslexia benefit from **one-on-one help**, which can enable them to move forward at their own pace. Also, students with dyslexia often need **extensive structured practice** and immediate, **corrective feedback** to develop automatic word recognition skills.

- 01 provide systematic, direct instruction in phonemic awareness and phonics
- 02 teach students to apply these skills to reading and writing
- 03 provide fluency training
- 04 include rich experiences listening to and using oral language

EMPOWERING ENGLISH LEARNERS

The number of English learners (EL) in the U.S. has grown significantly, as have the challenges for states and teachers to meet their needs. Under the Every Student Succeeds Act (ESSA), states must annually assess the English language proficiency of ELs, provide reasonable accommodations for them on state assessments, and develop new accountability systems that include long-term goals and measures of their progress.

English Learners in U.S. Public Schools, K–12



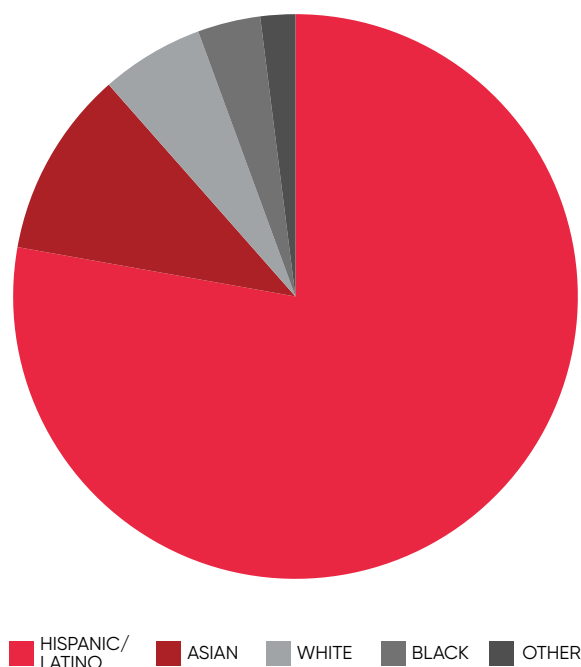
EL STUDENTS (IN THE MILLIONS)

SOURCE: National Center for Education Statistics (NCES)

Between the 2009–10 and 2014–15 school years, the percentage of ELs in the U.S. increased in more than half of the states, with increases of over 40% in five states.

The racial/ethnic composition of the EL student population in 2014–15 breaks down as follows:

K–12 EL Students in the U.S., 2014–2015



SOURCE: U.S. Department of Education

Among ELs with disabilities, nearly 50% had a specific learning disability, compared to nearly 38% of students with disabilities who are not ELs.



Nazir, a high-school student in California, arrived in the U.S. recently from Afghanistan. In his native country, he had been a top student, but at his new school, unable to read or write English, he finds himself far behind the other students in his grade. He worries about whether he will get a chance to go to college and pursue his dream of becoming a dentist.

While the growth of the EL population has brought greater challenges to meeting the needs of these students, it has also brought an opportunity to embrace multicultural and multilingual education and an increased focus on improving EL instruction. A 2014 Institute of Education Sciences review of best practices, entitled "Teaching Academic Content and Literacy to English Learners in Elementary and Middle School," resulted in four recommendations:

- 01 Teach a set of **academic vocabulary words** intensively across several days using a variety of instructional activities.
- 02 Integrate **oral and written English language instruction** into content-area teaching.
- 03 Provide regular, **structured opportunities** to develop written language skills.
- 04 Provide **small-group instructional intervention** to students struggling in areas of literacy and English language development.

Research shows that for **mixed-ability classes** that include ELs, explicit, interactive instruction results in the greatest text comprehension gains, especially when the instruction relates the academic vocabulary words in the text to focal lesson concepts or when the words have general use in academic contexts.

Other studies have determined that **students need to be reading not only deeply but widely** and building their vocabulary and knowledge. **Wide reading**, a strategy designed to increase students' daily reading practice, is particularly important for ELs, who benefit from learning word meanings in context rather than as separate lists of words.

Additionally, direct instruction in oral and written **academic language** for English learners is critical. For example, teaching vocabulary and grammar as it is used in specific genres prepares ELs to succeed with academic writing tasks.

SOCIAL-EMOTIONAL LEARNING AND ACHIEVEMENT

Social-emotional Learning (SEL) is another area that has become a major focus in education, as it is connected to academic achievement, including the development of reading proficiency. SEL is generally defined as the process by which students develop the knowledge, attitudes, and skills needed to understand and manage emotions, set and achieve goals, feel and show empathy for others, maintain positive relationships, and make responsible decisions.

Neuroscience research has shown that when students understand the goals of their work, they are more likely to stay focused, self-monitor, and appreciate their own progress. Furthermore, as students master self-discipline, self-motivation, and stress management—and learn to organize their approach to learning more—they achieve greater success in school. Self-regulation has been linked to academic achievement, and students who display this aspect exert more effort and have greater persistence in the face of challenges.

In addition to improvements in grades, attendance, and performance in core subjects, other benefits from social-emotional learning programs include

reductions in aggression, substance abuse, delinquency, depression, and anxiety.

Dr. Bill Daggett, founder of the International Center for Leadership in Education® (ICLE), notes that SEL has traditionally been viewed as “the responsibility of a few staff for just those students in need of intervention and treatment services.” But Daggett predicts that in 2019, “the growing focus on and around SEL will accelerate to a point where districts address it as a core responsibility of *all* staff and view it as a development stage for *all* students.” The impact, he says, will be such that SEL will eventually be layered into curricula.

3 Things Educators Should Expect This Year in Their Schools



hnhco.com/expectationsblog

Schools that invest in SEL programs experience a return on their investment of \$11 for every dollar spent.

SOURCE: Center for Benefit-Cost Studies of Education at Columbia University's Teachers College, 2015

Multiple Individual and Social Benefits

SOURCE: American Journal of Public Health

A 2015 national study published in the American Journal of Public Health found statistically significant associations between SEL skills in kindergarten and key outcomes for young adults years later in:



EDUCATION



EMPLOYMENT



CRIMINAL
ACTIVITY



SUBSTANCE
USE



MENTAL
HEALTH

Reading intervention specialist and middle school teacher Amy Dendinger describes SEL as “not an emotional intervention, but an academic one.” She suggests that teachers follow these tips when implementing SEL in the classroom:



Proactive techniques, like greeting students at the door, help promote a sense of belonging and provide students with the support they need to feel invested in their learning.



Brain breaks help students center their minds and bodies, and can provide the tools for self-regulation. They include reflective activities like journaling, mindfulness exercises like guided breathing, and meditation.



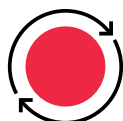
Acknowledging your faults is part of maintaining your well-being. Reflect on your flaws openly with students, apologize when you're wrong, and don't be afraid to ask for help.



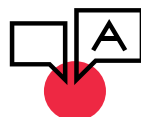
Wide-reading experiences help students learn to connect emotionally with others and recognize their own feelings. By following the development of a character, and how the character copes with different situations, students can be inspired to engage in open discussion where they personally connect to the character.



Communication is key to building a positive classroom culture and creating strong relationships with students. Encourage students to speak up when they are upset or need to express themselves.



With **group activities** as a regular part of your classroom culture, students can forge stronger bonds with peers and practice communication and collaboration skills.



Like everyone else, students will have good days and bad days. **Remember that these feelings are very real.** If a student is frustrated or upset, have a conversation with him or her. Ask the student to put into words how he or she is feeling, and why. This can help build understanding and trust.

Implementing Social-Emotional Learning in the Classroom: 6 Tips



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Dr. Cary Sneider, an NGSS Writing Team Leader and Associate Research Professor at Portland State University, says that teamwork, collaboration, and participating in productive discourse are all essential to SEL. He adds that students must be active, not passive, learners. For example, instead of a science teacher asking students a question and soliciting answers—a scenario in which Sneider says “students are actively listening, but they aren’t generating their ideas”—he recommends having students work in small groups: “They’ve got their assignment and are generating the questions and the answers. They are discussing the different points of view and having those very engaging

discussions. It is much more exciting to be involved in a conversation of that sort.”

Sneider also suggests that teachers work to create a classroom environment “where it’s **safe for students to disagree** and where it’s clear that disagreement is really the only way to make progress. . . . Have students express those differences clearly to each other and be willing to understand what the other person is trying to say.”

Social Emotional Learning: Using Collaboration in Science



hnhco.com/collaborationblog

THINKING AHEAD

While we now have a great understanding of how the human brain works, and the activity that goes on inside of it as children learn, there is still much that remains to be discovered.

“I think we’ve barely scratched the surface,” Ted Hasselbring says. “We do know a lot, but I don’t see us stopping that arm of research anytime in the near future—or even the distant future. I think we’ll continue to learn more about the human brain for decades to come.”

What will *not* change any time soon is the need for reading intervention for striving students and for Social-Emotional Learning in the classroom. Based on the knowledge we possess currently about the brain, and with the technology, strategies, and solutions available to address the literacy needs of

striving students and to implement SEL, educators have a wide array of resources to help learners like Jessie and Nazir—and so many others—accelerate, achieve, and thrive.



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