

In 2005, CEI published *Why ELS Works: Its Scientific, Theoretical, and Evaluation Base*, documenting the scientific evidence that grounds every component of the program: the content, lesson design, instructional strategies, and implementation features. The paper addressed the various populations of learners who benefit from this remarkable program, but it did not focus on any one in particular.

Subsequent to that publication, some schools have requested the specific research as to why the program is appropriate for English-language learners, the economically disadvantaged, students who have learning disabilities, adult basic education, or learners who are dyslexic. CEI staff, therefore, in response to those requests, have gone back to the research and distilled the information pertaining specifically to the various subgroups. What is clear in looking at these thousands of pages of documentation is that the developmental path for learning to read is the same for all learners. There are, however, variables that make it necessary to provide more emphasis and/or more practice/repetition in certain areas, based on the individual needs of the students.

WHY ELS WORKS

... for Dyslexics

Another thing that emerged from our analysis is that the studies, in general, emphasize the five critical components of reading instruction advocated by the National Reading Panel (2000): phonemic awareness, phonics, vocabulary, fluency, and comprehension. But, depending on the subgroup being studied, there are frequently additional components found to be important — or the reasons for including one particular component will be different from the reasons cited for a more general population.

We are excited about this work, for even when we examine one subgroup at a time, the evidence is overwhelming that *Essential Learning Systems (ELS)* is a powerful intervention for all these learners, especially given its

therapeutic approach that provides an individualized prescription for each student based on a careful diagnosis of need and then frequent and ongoing monitoring to ensure progress.

A brief summary of the findings relative to dyslexic learners follows. Since dyslexia is generally believed to be the result of impaired phonological processing, the preponderance of studies finds that phonological awareness, explicit instruction in spelling, and fluency development are the areas of emphasis.

DYSLEXIA IDENTIFICATION AND PREVALENCE

Researchers generally agree that dyslexia affects anywhere from six to about 18% of the general population. It definitely runs in families, and it

frequently is co-morbid; that is, it frequently occurs with at least one other disorder. Researchers are converging in their understandings that dyslexia is neurobiological in origin, meaning that the problem is located physically in the brain, and the result is faulty sensory processing — the root cause of many learning difficulties and disabilities. Symptoms of dyslexia include delayed speech, poor organization skills, memory problems, difficulties in decoding, difficulties in spelling, and inability to discriminate between sounds.

Letter Recognition

Researchers advocate a great deal of practice and repetition in ensuring that students are fluent (both accurate and rapid) in letter knowledge. We have known for a long time

that letter recognition is one of the best predictors of children's success in learning to read, but delays in learning the letters and their sounds have only recently been identified as a potential identifier of dyslexia. A theme that runs through these studies is that letter recognition alone is important but insufficient. Students must also learn how to connect the letter sounds to those letters, so that is why phonological awareness becomes one of the areas of emphasis.

The research on the importance of letter recognition led CEI in 2006 to invest the resources to embed its supplemental *Letter Recognition* program into *ELS* for the 2007-08 release. Interestingly, this new feature has been much applauded not only by primary grade teachers, but also by those running dyslexia programs and by those serving ELLs since many second-language learners of all ages do not know the English alphabet.

Phonological Awareness

Since dyslexia is the result of individuals' inability to process the sounds of the language, phonological awareness takes center stage in an intervention that must strengthen the neural pathways in the brain or build new ones that will enable dyslexics to learn how to read. *ELS'* SHARE exercises provide the initial instruction (using multi-sensory processing strategies) that enable students to acquire phonological awareness. We teach phonemes, blending and segmenting, sounds, decoding, spelling, vocabulary, and fluency in an integrated and contextual fashion that makes it possible — once students move to the supporting tasks — for practice to move this knowledge and skill into long-term memory.

Researchers recommend multiple and varied exercises to teach rapid naming of letters and words, the use of direct and explicit instruction to teach the critical knowledge and skills related to phonological awareness, a combination of phoneme awareness and phonics, explicit teaching of sound families, and a focus on fluency development in order for dyslexics to thrive. As Lishman (2006) states, "... phonological approaches to remediation are extremely important. Indeed, the concentration in teaching on the rehearsal of phonological skills is given a large measure of scientific respectability."

Spelling

Dyslexia researchers almost all focus on spelling as a critical intervention

component, although the National Reading Panel did not. Students who have difficulties in recognizing letters, in processing sounds, in segmenting and blending, and in decoding will inevitably have difficulties in spelling. Too, students who cannot spell have great difficulties in learning to write since they use most of their cognitive resources just trying to figure out how to spell, making it almost impossible also to attend to punctuation, grammar, style, organization, vocabulary choices, and meaning.

These research-based strategies to teach spelling are all reflected in the *ELS* program:

- ☑ using a write-say intervention with immediate feedback to the visual and auditory modalities to improve spelling accuracy
- ☑ teaching decoding and spelling in combination with phonological skills
- ☑ teaching explicitly the spelling patterns (since about 84% of English words are predictable)
- ☑ using clear and consistent speech production
- ☑ fluency development, to the point of overlearning since such practice/ repetition is necessary for accurate and fluent performance
- ☑ including dictation exercises and using the lesson words in personal writing since some students can spell words correctly on a test, yet miss them when writing a composition
- ☑ use of diagnostic assessment and continuous-progress monitoring
- ☑ incorporation of multi-sensory processing strategies
- ☑ using computer-assisted instruction
- ☑ integrating the teaching of spelling and vocabulary

Fluency Development

A major strength of *ELS* is its fluency development component. *ELS* developers were well aware of the research on this issue in the original design of the program and made sure that the program includes not only effective instruction, but also more-than-adequate and varied practice/ repetition activities to ensure that students learn the critical knowledge and skills to the mastery level and can perform both accurately and rapidly. Researchers note that without fluency people use all their working

memory resources to decode or spell and have nothing left for comprehension. Interestingly, although comprehension strategies per se are not explicitly taught in *ELS*, the reading comprehension scores soar from the pre- to the post-tests. We know that we have a profound effect on comprehension because we teach fluency well—and we also teach vocabulary, which develops background knowledge that is also important to comprehension.

Palumbo and Willcutt (2006) are among those who study dyslexia and what works to teach those learners how to read. For fluency to develop, they state, three steps are necessary:

1. Basic reading skills must be taught until the students are accurate at word recognition.
2. Once accuracy is achieved, providing practice is essential for students to go beyond accuracy to fluency.
3. Because the first two tasks are hard, students often want to quit before the task is mastered. Therefore, motivation is essential to keep them on task until they become fluent.

CEI agrees. That is why the lessons emphasize both the basic skills and provide plenty of practice for fluency to occur. That is also why we structure the program in ways for students to experience high levels of success, provide immediate feedback that is positive and encouraging, recognize students' success, and train lab facilitators in other motivational strategies.

Vocabulary

Vocabulary development is important for all learners, but it is not necessarily a major issue with dyslexics since, for the most part, their IQs are either average or above, and they may possess sophisticated oral vocabulary skills. Researchers point out, however, that many dyslexics do need considerable work in this area. Low-IQ dyslexics and dyslexics who come from disadvantaged backgrounds are among those who will need such instruction. Researchers also note that much repetition is necessary. Nagy and Scott (2000) urge "multiple and varied encounters" with each new word and find that "even four instructional encounters of high quality do not lead to a level of word

CLUES TO DYSLEXIA IN EARLY CHILDHOOD

by Sally E. Shaywitz (2004)

The specific signs of dyslexia, both weaknesses and strengths, in any one individual will vary according to the age and educational level of that person. The five-year-old who can't quite learn his letters becomes the six-year-old who can't match sounds to letters and the 14-year-old who dreads reading out loud and the twenty-four-year-old who reads excruciatingly slowly. The threads persist throughout a person's life.

The earliest clues involve mostly spoken language. The very first clue to a language (and reading) problem may be delayed language. Once the child begins to speak, look for the following problems:

The Preschool Years

- Trouble learning common nursery rhymes such as "Jack and Jill" and "Humpty Dumpty"
- A lack of appreciation of rhymes
- Mispronounced words; persistent baby talk
- Difficulty in learning (and remembering) names of letters
- Failure to know the letters in his own name

Kindergarten and First Grade

- Failure to understand that words come apart; for example, that batboy can be pulled apart into bat and boy, and later on, that the word bat can be broken down still further and sounded out as: "b"."aaa"."t"
- Inability to learn to associate letters with sounds, such as being unable to connect the letter "b" with the "b" sound
- Reading errors that show no connection to the sounds of the letters; for example, the word big is read as goat
- The inability to read common one-syllable words or to sound out even the simplest of words, such as mat, cat, hop, nap
- Complaints about how hard reading is, or running and hiding when it is time to read
- A history of reading problems in parents or siblings

In addition to looking for indications of problems in speaking and reading, here are some indications of strengths to look for and applaud in your child:

- Curiosity
- A great imagination
- The ability to figure things out
- Eager embrace of new ideas
- Getting the gist of things
- A good understanding of new concepts
- Surprising maturity
- A large vocabulary for the age group
- Enjoyment in solving puzzles
- Talent at building models
- Excellent comprehension of stories read or told to him

Many of these indicate strengths in higher-level thinking processes.

Excerpted and adapted from **Overcoming Dyslexia: A New and Complete Science-Based Program for Reading Problems at Any Level**

knowledge adequate to measurably improve comprehension of text containing the instructional word."

ELS teaches more than 2000 words directly and to the mastery level and several thousand others indirectly. Not only do assessments show improved performance in vocabulary and reading comprehension among ELS lab students, but anecdotes abound. CEI staff hear stories continuously about teachers and parents noticing that the students start using new and more sophisticated vocabulary almost immediately. This new knowledge also is important to their self-confidence and sense of efficacy as learners.

Comprehension

Multiple studies confirm what many teachers observe on an ongoing basis. That is, "the most important cause of reading comprehension failure in children stems from difficulties with decoding and word recognition; if children cannot read words with a reasonable degree of accuracy, their comprehension is likely to be compromised" (Nation, 2006). Other studies confirm the importance of vocabulary in comprehension since it builds background knowledge.

INSTRUCTIONAL STRATEGIES

Multi-sensory Processing

The research literature on effective interventions for students with difficulties and/or disabilities in learning frequently point to the need for multi-sensory processing strategies for effective interventions. Jamieson and Simpson (2006), for instance, state,

There is no doubt that learning is facilitated when more than one, preferably three, sensory channels are activated. When teaching at the word level, the well known "look, cover, say, write, check" spelling method uses simultaneous visual, auditory, and kinesthetic feedback, in an endeavour to support memory and lead to automaticity in producing particular letter sequences."

Multi-sensory strategies are also advocated by the International Dyslexic Association (2000) "to enhance memory and learning." Researchers further note that such strategies are greatly facilitated by the use of computer software for instruction since the technology not only provides the multi-sensory approach, but it can also totally individualize instruction, as ELS does.

Multi-sensory processing strategies address student weaknesses and enable neural pathways to be strengthened or built to make learning possible. They also address student strengths, enabling students to use their areas of strength that "mitigate areas of weaknesses (Sousa, 2001)," resulting in improved performance.

Practice/Repetition

Effective interventions also invariably include multiple and varied practice/repetition opportunities. These are critical for fluency development and for learning to the mastery level. Hatcher (2006) summarizes as follows:

All teachers know that, after pupils have been shown something for the first time and have learned how to do it accurately, they need to be able to practice the skill until it has become second nature to them. The problem for teachers is often planning for sufficient practice time in a crowded curriculum and a busy classroom schedule.

ELS includes more-than-adequate practice/repetition activities. These tasks go far beyond what any teacher can provide on her own in a classroom full of students. Too, most commercial products, although they include practice activities, rarely include enough of them for mastery to occur for struggling learners. Not only does ELS have more than is needed for any one student, but they are individually prescribed so that a student gets only what he or she needs. Too, the activities are varied so as to keep students engaged and motivated and to avoid boredom, which is the result of simply doing the same thing over and over. Another major benefit is that the computer makes multi-sensory strategies possible in every lesson, and it does all the record-keeping so that the teacher has neither to score each activity, nor be responsible for providing all the necessary feedback for students to stay engaged.

A relatively new feature of ELS is that CEI has moved several of the practice activities to its web-based activity center (WAC). ELS students are given a password that enables them to access these practice activities in the lab, at home, or at any internet-connected computer. ELS teachers report that this feature results in extended learning opportunities for students who need it.

Individualization

Effective interventions, especially for students who are dyslexic or who have other learning disabilities, are individualized and differentiated so that each learner gets precisely what he or she needs to move forward and so that he or she stays in what Vygotsky calls the “zone of proximal development.” Vance and Mitchell (2006) define this component as follows:

Differentiation should teach to students’ strengths, use their preferred modality, chunk information to an appropriate size and present it at the preferred speed. This might include using visual or kinesthetic presentation styles, removing distractions, using simple vocabulary, simple grammar and short sentences, and speaking more slowly or more quickly.

ELS’ use of assessment data and computer-assisted instruction makes individualization and differentiation possible. Even in a dyslexia classroom, the students will each have their own individual needs. ELS enables the teacher to ensure that each one gets not only the appropriate content, but also that it is presented in an individually appropriate way. ELS’ sequences and the variety of parameter settings are keys to making the difference that each teacher desires: improved academic performance.

Computer-assisted Instruction (CAI)

There is really no doubt that computer-assisted instruction can be an effective vehicle for delivery of instruction to dyslexic students. CEI has mounds of studies on the efficacy of CAI for interventions in general and for students with disabilities. The benefits are numerous:

CLUES TO DYSLEXIA FROM SECOND GRADE ON

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The following are some clues to dyslexia for children in second grade and beyond:

Problems in speaking

- Mispronunciation of long, unfamiliar, or complicated words; the fracturing of words – leaving out parts of words or confusing the order of the parts of words; for example, "aluminum" becomes "amulium"
- Speech that is not fluent – pausing or hesitating often when speaking, lots of "um's" during speech, no glibness
- The use of imprecise language, such as vague references to stuff or things instead of the proper name of an object
- Not being able to find the exact word, such as confusing words that sound alike: saying "tornado" instead of "volcano," substituting "lotion" for "ocean," or "humanity" for "humidity"
- The need for time to summon an oral response or the inability to come up with a verbal response quickly when questioned
- Difficulty in remembering isolated pieces of verbal information (rote memory) – trouble remembering dates, names, telephone numbers, random lists

Problems in reading

- Very slow progress in acquiring reading skills
- The lack of a strategy to read new words
- Trouble reading unknown (new, unfamiliar) words that must be sounded out; making wild stabs or guesses at reading a word; failure to systematically sound out words
- The inability to read small "function" words such as "that," "an," "in"
- Stumbling on reading multisyllable words, or the failure to come close to sounding out the full word
- Omitting parts of words when reading; the failure to decode parts within a word, as if someone had chewed a hole in the middle of the word, such as "conible" for "convertible"
- A terrific fear of reading out loud; the avoidance of oral reading
- Oral reading filled with substitutions, omissions, and mispronunciations
- Oral reading that is choppy and labored, not smooth or fluent
- Oral reading that lacks inflections and sounds like the reading of a foreign language
- A reliance on context to discern the meaning of what is read
- A better ability to understand words in context than to read isolated single words
- Disproportionately poor performance on multiple choice tests
- The inability to finish tests on time
- The substitution of words with the same meaning for words in the text he can't pronounce, such as "car" for "automobile"
- Disastrous spelling, with words not resembling true spelling; some spellings may be missed by spell check

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CLUES TO DYSLEXIA FROM SECOND GRADE ON

(continued from page 7)

- Trouble reading mathematics word problems
- Reading that is very slow and tiring
- Homework that never seems to end, or with parents often recruited as readers
- Messy handwriting despite what may be an excellent facility at word processing – nimble fingers
- Extreme difficulty learning a foreign language
- A lack of enjoyment in reading, and the avoidance of reading books or even a sentence
- The avoidance of reading for pleasure, which seems too exhausting
- Reading whose accuracy improves over time, though it continues to lack fluency and is laborious
- Lowered self-esteem, with pain that is not always visible to others
- A history of reading, spelling, and foreign language problems in family members

Strengths:

- Curiosity
- A great imagination
- The ability to figure things out
- Eager embrace of new ideas
- Getting the gist of things
- A good understanding of new concepts
- Surprising maturity
- A large vocabulary for the age group
- Enjoyment in solving puzzles
- Talent at building models
- Excellent comprehension of stories read or told to him

Many of these indicate strengths in higher-level thinking processes.



- ☑ motivation for students
- ☑ immediate and non-judgmental feedback for students
- ☑ minimized distractions from the environment
- ☑ individualization and differentiation
- ☑ multi-sensory processing
- ☑ consistent, high-quality instruction every day for every student
- ☑ multiple and varied practice opportunities
- ☑ inclusion settings since program is individualized
- ☑ fluency
- ☑ data provided to inform instruction
- ☑ record-keeping on student progress

ELS is constructed in ways that leverage the power of all these advantages. Another important benefit is that the lesson screens are intentionally uncluttered since the research indicates that the busyness of many computer screens distract struggling learners significantly and actually prevent them from learning. *ELS* screens include simple pictures, few words per screen, the consistent use of color and font, and other devices to facilitate learning.

Assessment and Feedback

Converging research indicates that the best uses of assessment are to diagnose student needs and then to monitor continuously their progress so that instructional adaptations/modifications can be made so that each individual continues to progress. These are critical components of any therapeutic intervention, of course, and *ELS*' comprehensive assessment system includes third-party assessments for diagnosis and program evaluation, as well as criterion-referenced placement tests for each mastery cycle and progress monitoring.

ELS provides feedback in numerous ways. One way, highly recommended by the research, is through immediate oral encouragement to the learner. Another is the feedback provided via the daily progress reports, which benefits both the student and the teacher. Another is through the regular parent reports that are available in both English and Spanish.

The newest *ELS* versions include yet another powerful feedback mechanism for *ELS* lab facilitators through **CEI Direct** (CEID). This new feature allows the lab facilitator to e-mail directly to her Solutions Analyst individual student records of progress for advice on whether the student is placed in the program appropriately, on how to set the lesson parameters for greater success, on whether the student is assigned to the appropriate sequence, and on how to improve motivation to learn. This 24/7 service has greatly improved lab effectiveness since the teachers no longer need to wait for a lab visit to get the help that they need.

Teacher Role

Some express concerns about computer-assisted instruction for dyslexics versus a delivery system entirely dependent on an individual teacher. Be assured that *ELS* also incorporates the research on the critical role of teachers in effective interventions. *ELS* has never been merely about software. A major part of Chapter II of the original research paper discusses the numerous expectations for teachers in an effective lab. Subsequently, we have also published a document that outlines in detail the instructional responsibilities of lab facilitators and the importance of the facilitator's judgment in monitoring student performance. *ELS* is used in a dyslexia lab in similar ways that print materials might be used. In fact, it is far less scripted and demands far more of the teacher than many programs dependent on print materials. CEI never recommends that a school merely put kids in front of the computers and walk off. Rather, the extensive training and support that we offer our labs constantly emphasize the opposite — that the role of the teacher is a key to the success of the students.

RESOURCES

Those seeking to understand why *ELS* works for dyslexic learners of any age can find much information from the following:

- *Why ELS Works: Its Scientific, Theoretical, and Evaluation Research Base*, available for download from www.ceilearning.com
- *ELS Correlation to TEA's "Components of Dyslexia Instruction"*
- *Essential Learning Systems and Its Correlation to a Successful Intervention for Left Occipitotemporal Systems*
- "Double Your Treasure: Why Dyslexics Need *ELS* and *MLS*" (Go to www.ceilearning.com; then, click on "news," then "share," and then type the title into the search field at the top of the page.)
- Search CEI's *SHARE Magazine* archives for articles related to dyslexia. Go to www.ceilearning.com; then, click on "news," then on "share," and then on "dyslexia."
- Find results for dyslexics in *ELS* labs. Go to www.ceilearning.com; then, click on "results," then on "dyslexia." The second page of the document includes the statistics.
- *Why ELS Works for Dyslexics*, a compilation of research findings related to dyslexia, along with a comprehensive bibliography, which this article summarizes. Available by request from 800.234-7319, extension 131, or by e-mailing info@ceilearning.com.
- References from *ELS* labs serving dyslexic students. Available by request from 800.234-7319, extension 131, or by e-mailing info@ceilearning.com.

CLUES TO DYSLEXIA IN YOUNG ADULTS AND ADULTS

by Sally E. Shaywitz (2004)

The following are some clues to dyslexia in young adults and adults:

Problems in speaking

- Persistence of earlier oral language difficulties
- The mispronunciation of the names of people and places; tripping over parts of words
- Difficulty remembering names of people and places and the confusion of names that sound alike
- A struggle to retrieve words: "It was on the tip of my tongue."
- Lack of glibness, especially if put on the spot
- Spoken vocabulary that is smaller than listening vocabulary and hesitation to say aloud words that might be mispronounced

Problems in reading

- A childhood history of reading and spelling difficulties
- Word reading that becomes more accurate over time but continues to require great effort
- Lack of fluency
- Embarrassment caused by oral reading: the avoidance of Bible study groups, reading at Passover seders, or delivering a written speech
- Trouble reading and pronouncing uncommon, strange, or unique words, such as people's names, street or location names, food dishes on a menu (often resorting to asking the waiter what the special of the day is or saying, "I'll have what he's having," to avoid the embarrassment of not being able to read the menu)
- Persistent reading problems
- The substitution of made-up words during reading for words that cannot be pronounced — for example, "metropolitan" becomes "mitan" — and a failure to recognize the word metropolitan when it is seen again or heard in a lecture the next day
- Extreme fatigue from reading
- Slow reading of most materials: books, manuals, subtitles in foreign films
- Penalizing by multiple-choice tests
- Unusually long hours spent reading school or work-related materials
- Frequent sacrifice of social life for studying
- A preference for books with figures, charts or graphics
- A preference for books with fewer words per page or with lots of white showing on a page
- Disinclination to read for pleasure
- Spelling that remains disastrous and a preference for less complicated words that are easier to spell in writing
- Particularly poor performance on rote clerical tasks

Excerpted and adapted from ***Overcoming Dyslexia: A New and Complete Science-Based Program for Reading Problems at Any Level***