Research-Based Reading

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Introduction

iSPIRE® is a research-based reading intervention program that uses cutting edge technology to deliver teacher-led instruction. In a position paper on *New Literacies and 21st Century Technologies*, the International Reading Association states, "The Internet and other forms of information and communications technologies (ICTs) are redefining the nature of reading, writing, and communication" (2009, p. 2). The federal Every Student Succeeds Act of 2015 (ESSA) has identified use of technology as one of its key themes. Important advances have been made in recent years in our understanding of how technology can best support teaching and learning. *iSPIRE* represents the next-generation edition of a classroom-tested curriculum targeted to the needs of seriously struggling readers. *iSPIRE* puts new tools in the hands of both students and teachers to enhance their opportunities for achievement.

iSPIRE provides intensive, structured learning experiences that address needs in phonemic awareness, phonics and decoding, spelling, and fluency, vocabulary, and comprehension. Lessons are presented by the teacher, who has the *iSPIRE* lesson plan displayed on her laptop or other electronic device. She controls the pacing of the lesson based on the specific small group or classroom context. At pertinent moments in the lesson, the teacher sends lesson content to students' devices as she leads the lesson. These online lesson components are provided through *iSPIRE's* carefully designed and easy-to-use software.

Teachers lead students as they engage actively in the online work and receive immediate feedback. Instruction is multisensory, with auditory, visual, and kinesthetic/tactile strategies employed in the teacher-led 10-step lessons. Some handwritten lesson segments, focused on kinesthetic/tactile learning, are done by the students in *iSPIRE* dictation activities. Teachers constantly interact with students throughout the 10-step lesson, obtaining feedback that allows them to make real-time adjustments in instruction. Concept Assessments at the end of each lesson provide assurance that students have mastered the concepts under study. Results are organized and presented in the management system so that teachers can carefully monitor student progress. They can also easily share data with administrators, teaching teams, and parents.

Most students in our schools successfully acquire literacy as they proceed through the grades, year by year, building their ability to read and write. Students with serious literacy difficulties, however, will benefit from *iSPIRE's* well-organized, intensive intervention, targeted to their specific needs and correlated with the foundational skills found in current state and national standards. For example, the Every Student Succeeds Act (ESSA) emphasizes the needs of a broad range of students, including English Language Learners, students in low income schools, and special learners. Also, Response to Intervention (RTI) efforts in schools have addressed the needs of struggling students (Tier 2) and severely struggling students (Tier 3). In addition, over the past several years, grassroots movements in a number of states have worked with state legislators to identify and address needs of students identified as dyslexic.

A student's experience with *iSPIRE* starts with a placement test that identifies into which of the six *iSPIRE* levels each student will be placed. Each level addresses a variety of concepts, including letter recognition, phonics (for example, the short *i* sound or the *-ang* letter group), syllabication (for example, open syllables), or morphology (*-ish* and *-ness*). Each concept is taught with a 10-Step Introductory Lesson that is followed by 10-Step Reinforcing Lessons and by independent reinforcing activities.

All lessons follow the basic 10-step *iSPIRE* format:

1) phonogram cards

2) phonological awareness

3) word building

4) decoding and sentence reading

5) prereading

6) reading

7) sound dictation

8) prespelling

9) spelling

10) sentence dictation.

The Impact of Technology

iSPIRE's technology has been specially designed to help teachers deliver instruction and provide learning experiences for their students. The teacher screen provides guidelines for instruction and easy ability to activate student online learning experiences. *iSPIRE's* design enables teachers and students to engage in seamless, fast-paced lessons that take advantage both of direct instruction by teachers and active online learning experiences by students.

iSPIRE is built on well-established research-based principles of technology-based instruction:

Instruction is blended. That is, students are not placed alone at computers and isolated from their teacher's monitoring. The teacher plays a central role in the *iSPIRE* lesson presentation (Clarebout, Elen, Jiang, Lust, & Collazo, 2014).

Learning is multimodal and multisensory (Mayer, 2014).

Instruction is objectives-oriented, correlated with state and national standards. In their survey of effective use of reading and writing technology, Connor, Goldman, and Fishman (2014) emphasize the importance of instruction and practice targeted to research-identified key literacy skills.

Lessons emphasize differentiation of instruction. Students who struggle with particular concepts in *iSPIRE* lessons are immediately identified, and teachers can provide additional attention to them (Connor, Goldman, & Fishman, 2014).

iSPIRE is designed to promote success through mastery learning. As students complete their activities and lessons, assessments determine whether they have mastered the target concepts and are ready to move on.

The instructional scope and sequence provides for integration of meaningful connections between lessons, with sequenced review of concepts presented for long-term learning.

Recent improvements in technology-based instructional design have resulted in instructional improvements, and newer approaches are producing positive findings (Zhao, et al., 2005). One such improvement is the recognition that, as employed in *iSPIRE*, a combination of traditional face-to-face teaching and online instruction (often called *blended learning* or *hybrid learning*) offers advantages over purely online instruction and is rapidly being employed in K–12 schools (U.S. Department of Education, 2009). In her national survey of research, Staker (2011) concludes that the blended learning instructional model has the potential of transforming instruction to be "student-centric, highly personalized for each learner, and more productive" (p. 3). *iSPIRE's* blended learning approach, in which the teacher directs and guides instruction but takes advantage of the unique capabilities of online instruction, allows for a positive integration of the best of both traditional and technology-based instruction.

In their survey of research on teachers using support devices, such as tablets, iPads, or laptops employed in *iSPIRE* blended learning lessons, Clarebout, Elen, Jiang, Lust, and Collazo (2014) found that teachers act in two critical ways to support instruction. They provide metacognitive scaffolds to guide students to be instructionally knowledgeable. RTI Tier-2 and -3 students are at-risk of failing to understand the ideas, concepts, and theories underlying the tasks they are asked to perform, resulting in learning failure. Teachers involved minute-by-minute in a blended learning lesson provide that kind of metacognitive support (Cardullo, Wilson, & Zygouris-Coe, 2015). Also, teacher presence acts to provide the "considerable motivation" (p. 522) needed to focus student attention on mastering the language concepts under study, as unguided students tend to be more focused simply on finishing the task at hand.

Computer-based learning has a long history of research that validates its effectiveness with all types of students. Kulik's (1994) meta-analysis of 500 studies shows that, on average, students using computers grow to perform at the 64th percentile, compared to students using traditional instruction at the 50th percentile. In reading/literacy instruction, one of the most important research conclusions arises from the federally sponsored *National Reading Panel Report*, which has been the foundation for federal efforts to reform reading instruction. The researchers conclude that "all of the studies in the analysis report positive results" (2000, Section 6, p. 2).

While online learning is fairly new, a variety of research surveys indicate its effectiveness in improving student learning (Russell, 1999). For example, a U.S. Department of Education survey in 2009 of more than a thousand studies concludes that students who carried out all or part of their studies online perform better, on average, than students studying the same concepts through only face-to-face instruction. Much of the improvement comes about because of the increased time-on-task that the more efficient online learning can make possible.

One of the more worrisome aspects of some online learning is its dependence on education arcade drill-and-practice activities. The "edutainment" nature of these activities has become a source of concern to researchers (Connor, Goldman, & Fishman, 2014). Woodworth and Rieth (1997) argue, "Arcade games compete for time and attention in the context of drill and practice. . . . Arcade games seem to detract from high amounts of practice required of students with disabilities, if they are to master target skill areas" (p. 514). *iSPIRE* takes advantage of the personal presence of the teacher and the immediate relevance of the learning objectives to provide motivation and engagement (Clarebout, Elen, Jiang, Lust, & Collazo, 2014) rather than off-task gaming activities. This allows for the appropriate time-on-task in learning concepts that severely struggling readers require. In doing so, *iSPIRE*'s format more closely matches the methods that teachers have found most effective.

Research-Based Principles of Literacy Development—Best Practices

The search for the one best way to teach reading has been an active pursuit of educational researchers for at least forty years. In the mid-1960s, the United States Office of Education (USOE) carried out the comprehensive and influential *First Grade Studies*, the results of which were first published in 1967 and then—because of their importance to the history of the field—republished in 1997 (Bond & Dykstra, 1997). A wide variety of approaches to teaching early reading were evaluated. One major finding was that early reading curricula that incorporated a structured approach to teaching phonics and word recognition were superior to those that did not.

In the ensuing years, researchers in the field of reading and literacy have repeatedly addressed this issue of identifying the best way to teach reading. Their findings have sometimes been obscured by curricular fads that swept through schools, by individual teachers or researchers who enthusiastically popularize some particular approaches, and by research reviewers who have highlighted highly subjective, personalized reports in their compilations of research results.

In the confusion, a particular strand of research has consistently pointed to the same major principles of literacy development, results that confirm the findings of the early USOE *First Grade Studies* and go beyond them. This strand has followed scientific principles of research, basing conclusions on studies that objectively compare various teaching approaches and that subject the results to rigorous statistical interpretations. Three key principles of instruction stand out in this strand of research:

Reading lessons should be

- explicitly taught by the teacher;
- systematically planned and organized; and
- sequenced in a way that moves from simple to complex.

The first major study in this strand was carried out by the late Jeanne Chall, the noted Harvard University researcher who popularized the phrase "the great debate"—meaning the ongoing divisive arguments about finding the best method to teach reading—in her book *Learning to Read: The Great Debate* (1967/1996). Her book was based on the increasingly extensive body of research literature in existence up to that time, and she concluded that systematic phonics instruction is important (p. 307).

Some years later, Marilyn Jager Adams, with the sponsorship of the Center for the Study of Reading at the University of Illinois, undertook the task of updating Chall's efforts in *Beginning to Read: Thinking and Learning about Print* (1990). In the intervening years between Chall's work and Adams's, the field of reading had changed dramatically, under the influence of cognitive psychological research and by holistic approaches to reading instruction known as whole language. Despite the changes, however, Adams's research survey reached much the same conclusions as had Chall's (p. 117).

In recent years, the United States federal government's efforts to bring some closure to this debate over reading methodology has resulted in two large-scale committee reports on the state of the research. The first report was carried out by the Committee on the Prevention of Reading Difficulties in Young Children (Snow, Burns, & Griffin, 2000), a group appointed by the National Academy of Sciences at the request of the U.S. Department of Education and the U.S. Department of Health and Human Services. Their work involved examining hundreds of research studies in order to address a variety of issues related to early reading development. Once again, their conclusions supported the principles of earlier research reviews.

The National Reading Panel (2000) carried out what has been the most extensive of all the research reviews. This panel was established by the U.S. National Institute of Child Health and Human Development (NICHD). The panel's work has played a key role in the establishment of guidelines for the federal No Child Left Behind Act (U.S. Office of Education, 2004) that called for explicit, systematic reading instruction.

Studies have continued to support the systematic teaching of literacy. Morris, Bloodgood, Lomax, and Perney's (2003) longitudinal study of reading concludes, "What is needed is careful, systematic teaching, along with adequate review of the concepts taught" (p. 322). Leppanen, Niemi, Aunola, and Nurmi (2004) found that systematic instruction is particularly helpful for children who are low-performing. The National Institute of Child Health and Human Development's extensive *Study of Early Child Care and Youth Development* found that first-grade classrooms that were higher in instructional support yielded higher reading scores (NICHD Early Childhood Care Research Network, 2004).

Most recently, Hiebert and Pearson (2012–2013) analyzed innovations established under the Common Core State Standards Initiative (CCSSI) (2010). They concluded that the Common Core movement has not reversed our understanding of reading instruction. Instead, the Common Core State Standards (CCSS) emphasize early reading and literacy skills by clearly placing them as foundational. "Students need to learn the underlying, consistent patterns of written words. In plain talk, they need to break the code" (p. 48). Only then can they move on to achieving the more advanced skills at upper grade levels, reading critically and writing effectively.

iSPIRE addresses the principles of best practices as set forth by the research described above, as well as in the sets of professional standards published by professional organizations such as the International Literacy Association (previously known as the International Reading Association) and the International Dyslexia Association.

iSPIRE lesson plans and materials provide engaging tools designed to systematically and successfully teach literacy. *iSPIRE* lessons are flexible in nature, allowing for differentiated instruction while still providing the depth of learning necessary for struggling readers to succeed in learning to read.

iSPIRE provides a sequenced lesson plan structure that gradually moves students through a developmental process from emergent levels of literacy to early reading to accomplished, fluent reading. An actively involved teacher works with students throughout each lesson, making use of *iSPIRE's* technology to provide multisensory instruction, interactive activities, and engaging stories that enhance student attention. Each *iSPIRE* lesson is designed to facilitate the process of moving children from a particular concept important to early reading to the foundations of a lifelong love and commitment to literacy.

Most importantly, *iSPIRE* successfully guides students to skilled mastery in phonological awareness, phonics, fluency, vocabulary, and comprehension, the five major foci of both the National Reading Panel's report and the Common Core State Standards Initiative's (2010) Foundational Skills. The Common Core State Standards describe the following Foundational Skills, which lay the groundwork for literacy and are in complete harmony with the contents of *iSPIRE*: "Demonstrate understanding of . . . features of print; . . . spoken words, syllables, and sounds; . . . grade-level phonics and word analysis skills in decoding words; read with sufficient accuracy and fluency to support comprehension" (CCSSI, pp. 15–17).

In their article titled "CCSS-ELA: Suggestions and Cautions for Implementing the Reading Standards," Valencia and Wixon say this about adhering to the Foundational Skills: "Here we suggest close attention to the grade-level skills under the headings of Print Concepts, Phonological Awareness, Phonics and Word Recognition, and Fluency. The developmental research base for these foundational skills is well established, and the Grade-Level Standards for these Foundational Skills are helpful in determining a general scope and sequence for instruction" (2013, p. 183). The scope and sequence of *iSPIRE* provides this "close attention".

Phonological Awareness

In their book *Struggling Readers: Assessment and Instruction in Grades K–6* (2003), Balajthy and Lipa-Wade define phonological awareness:

> *Phonological awareness is a general term referring to an awareness (i.e., an ability to focus on and manipulate) the sounds of words and their components. . . . Phonological awareness includes phonemic awareness [the specific ability to manipulate individual phonemes, minimal sound units such as the /v/ in* vat *or the /f/ in* fat*], as well as such aspects of language as onsets (the initial letter sound[s] in a word, such as /b/ in* book *or /spl/ in* splash*), the sounds of syllables, and rhymes (p. 33).*

Teaching of phonological awareness is supported by a broad range of professional educational organizations (International Dyslexia Association, 1997; International Reading Association, 1998), the National Institute of Child Health and Human Development (Lyon, 1998), and such teaching is one of the five major foci of the federal No Child Left Behind Act as well as a key component of the Common Core State Standards (CCSS).

Research over the past thirty years has indicated that phonological awareness is central to the success of the reading process. O'Connor's (2011) survey of phonological awareness research found a strong relationship between those abilities and overall reading ability. McCulley, Katz, and Vaughn (2013) suggest that phonological awareness tasks have been shown to have the highest correlation of any factors with early reading achievement. Brady (2012) provides specifics on how the CCSS Foundational Skills derive from current research on both phonological awareness and phoneme-grapheme relationships (that is, phonics).

Snow, Burns, and Griffin's (1998) comprehensive survey of the research on this topic indicated that phonological awareness was a strong predictor of future reading achievement, with a correlation of .46 (p. 112). The National Reading Panel (2000) concurred, suggesting that it is one of the two best predictors (along with letter identification) of how well kindergartners learn to read (Section 2, p. 11).

The National Reading Panel's survey concluded that instruction in phonological awareness was effective in improving that skill. Instruction also improved both general reading and spelling (Section 2, pp. 3, 31–32). The study also concluded that, while some phonological development will occur naturally, explicit instruction leads to maximum development (Section 2, p. 33). A major finding pointed to the wide range of types of students with whom phonological awareness instruction was found to be effective. They included students at both lower and middle socioeconomic status levels, preschoolers, kindergartners, first graders, average and struggling readers, and English language learners (Section 2, p. 5). Suggate's (2016) more recent meta-analysis of phonological awareness intervention effectiveness also supports its effectiveness, especially with students reading at the preschool or kindergarten levels.

The National Reading Conference's White Paper on Effective Beginning Reading Instruction (Pressley, 2002) concurred in its survey of the research: phonological awareness is best learned when it is mingled with letter identification and decoding instruction (p. 180), as occurs in *iSPIRE* lessons. The National Reading Panel (2000, pp. 2–4) found that teaching phonemic awareness with the actual printed letters, another characteristic of *iSPIRE* lessons, was more effective than trying to teach it without print.

Oudeans (2003) investigated the advantages of integrated instruction in phonological awareness with kindergartners exhibiting low phonological awareness abilities. The experimental group integrated letter identification, decoding, blending, and segmenting during class periods. A control group was taught using a nonintegrated approach in which skills were taught separately. The integrated group, receiving instruction similar to *iSPIRE* lessons, showed higher achievement.

Just as researchers have identified writing as a key ingredient in the teaching of letter identification, so have they found that writing has a facilitating effect on the learning of phonological awareness (Morris, Bloodgood, Lomax, & Perney, 2003). The importance of children's writing in developing phonological awareness was also highlighted in Craig's 2003 work. This study, selected by the International Reading Association for its 2003 Outstanding Dissertation Award, had teachers use writing with "explicit explanations, demonstrations, and practice of phonological awareness and alphabetic skills" (p. 440). The instruction led to improvement in phonological awareness, as well as in word recognition and comprehension.

Nichols, Rupley, Rickelman, and Algozzine's (2004) research has raised concerns about the phonological development of specific groups of children. They found that Hispanic children and children of low socioeconomic status were more likely than others to fail to achieve an adequate understanding of phonology during their kindergarten years (p. 77) without use of supplemental curricula such as *iSPIRE*.

Phonological Awareness in *iSPIRE*

The *iSPIRE* program provides this integrated, explicit instruction in phonological awareness. In fact, in each *iSPIRE* lesson, students are led to use newly learned phonological awareness concepts in higher-level decoding and fluency tasks. Phonological awareness learning is consistently integrated with letter identification and phonics for better efficiency of learning.

The first step in the *iSPIRE* 10-step lesson is use of the Phonogram Cards. Students review previously taught concepts, and the lesson's new concept is introduced. For example, in one early lesson, the teacher will read on-screen the instruction to review all the previous Phonogram Cards, from #1 to #22. At this early level, these cards present individual letter identification tasks, such as *P*. In a Level 6 lesson, the most advanced level of *iSPIRE*, the new concept might be the /oy/ sound produced by the letter combination *oi*, a diphthong.

A suggested script is provided, in which the teacher gives instructions to the students to say the name of the letter and the letter sound when the card is shown. A standard screen display appears on the students' devices, indicating that students should look at the teacher's screen as the teacher displays it. Cards are displayed one-by-one on the teacher's screen, allowing for ease in materials management. As the teacher hits the right arrow on the side of each card, it slides off the screen and is replaced by the next card. If students struggle with one or more tasks, the teacher can use a bottom-of-the-screen menu to return to those, for additional instructional attention. Students are learning the phonological concepts involved in identifying individual letter sounds while simultaneously learning the more advanced phonics concepts of identifying the printed letter commonly associated with that sound.

Step 2 of each lesson deals directly with phonological awareness. At an early level, the teacher might ask, "Close your eyes. I will say a word. Repeat the word, and if you hear the /ă/ sound, raise your hand. . . . The first word is *hat*." At another level, student attention turns to their own screens. In one lesson, students are told to use dots at the top of the screen to represent the sounds in words provided by the teacher (a phoneme segmentation task). The teacher might say, "Road," and the students would first identify the number of phonemes in the word (three), then sequentially drag white (consonants) and green (vowels) dots to the bottom of the screen to represent the word (white-green-white).

Other steps may help develop phonological awareness, as well. In early lessons, Step 3 may involve a sound counting activity integrated with attention to phonics development. Students might practice their phonological segmentation skills with the word *bat* by counting the sounds on their raised fingers, prior to moving to a letter tile phonics activity. Step 8 (Prespelling) may involve both phonological and phoneme-grapheme analysis of a concept-related word: "Say *hat*. . . . What is the first sound you hear in *hat?* How many sounds do you hear in *hat?"*

Phonics

The importance of phonics instruction is recognized by major organizations in the field of reading education (International Dyslexia Association, 2009; International Reading Association, 2012) and by the National Institute of Child Health and Human Development (Lyon, 1998).

The National Reading Panel (NRP) report (2000, Section 2, p. 91) used a rigorous rating system to identify the research studies of decoding instruction that met the highest standards of educational research. The NRP studied the combined results using a meta-analytic statistical analysis. A major focus of the review was to determine whether approaches that provide explicit instruction—a sequenced course of study that begins simply and gradually grows toward greater complexity with a systematic organization of teaching of phonics—are effective:

> "The hallmark of systematic phonics programs is that they delineate a planned, sequential set of phonic elements, and they teach these elements, explicitly and systematically" (Section 2, p. 99).

The National Reading Panel's conclusion was that the studies suggested "systematic phonics instruction makes a bigger contribution to children's growth in reading than alternative programs providing unsystematic or no phonics instruction" (Section 2, p. 92). The studies indicated that students at beginning reading levels were capable of being effectively taught using systematic phonics instruction (Section 2, p. 93). In addition to finding that systematic phonics improved general reading growth, the panel also concluded that systematic phonics instruction improved:

- the future reading growth of kindergartners and first graders who are at risk of reading problems;
- the abilities of disabled readers, who were defined by the NRP as having average cognitive abilities but low reading scores;
- spelling among kindergartners and first graders; and
- the reading achievement of children in both lower and middle socioeconomic status groups (Section 2, p. 95).

The Every Student Succeeds Act (ESSA, 2015) includes an important focus on English Language Learners. Shanahan and Beck (2006) suggest that the same studies that validate use of explicit phonics instruction for native speakers show the importance that a solid foundation in phonics has for ELLs. Studies such as that by Martinez (2011) have demonstrated that explicit phonics instruction has a considerable impact on such English Language Learners' general literacy development. Jamaludin, Alias, and Johari's (2014) survey of research reported that the phonics instruction works backward to also improve phonological knowledge, including with ELL readers who have had limited exposure to English.

Early success in learning decoding and word identification strategies is crucial to continued success in reading (Wagner & Ridgewell, 2009), though there is some disagreement as to just *how* it functions to improve reading ability. Garcia & Cain (2013), for example, suggest that this early success results in a tendency of children to read more, which in turn results in increased reading achievement. Lack of success functions in the opposite direction: poorly performing readers becoming reluctant to read, so that they fail to put in the necessary time-on-task in reading. Ronald Carver's *"rauding theory"* (Carver, 2000), on the other hand, (combining reading with listening and speaking), posits that the ability to simply decode and identify words is sufficient in and of itself to lead to success in reading.

Whichever theory one might choose—and both may be right in different ways—the final conclusion is the same: success in what the Common Core State Standards call Foundational Reading Skills is critical (CCSS, 2010). The oddities of the English language spelling system are obvious, but an understanding of phoneme-grapheme patterns is crucial, as the majority of English words are phonetically regular.

However, phonics ability does not develop in a vacuum. It is built on an understanding of and ability to work with the sounds of language and knowledge of letters (National Reading Panel, 2000, Section 2, p. 96). Morris, Bloodgood, Lomax, and Perney's longitudinal study of kindergartners and first graders (2003) indicated that the development of early reading abilities is largely sequential, with alphabet knowledge first and beginning consonant recognition occurring next with most children early in kindergarten. Then children become able to understand the concept of a printed word and to recognize beginning and ending consonants. They then move on to advances in word recognition and beginning reading by the end of first grade.

Phonics in *iSPIRE*

The *iSPIRE* curriculum is organized into six levels that provide sequential development of phonics concepts through intensive multisensory instruction, engagement in activities, and close monitoring to ensure mastery. In Level 1, for instance, students learn vowel concepts such as short *a* and *i*, digraphs such as *sh* and *wh*, and welded sounds such as *ang* and *ink*. By Level 3, they have advanced to learning suffixes such as *-s*, *-ness*, and *-ish* and some syllabication, as well as exceptions. At Level 6, they learn less frequent phonic elements and morphemes, such as the diphthongs *oi* and *oy*, the digraph *ph*, and the suffixes *-able* and *-age*. The complete list of concepts is provided in the *iSPIRE Scope and Sequence*.

Grapheme-phoneme relations are explicitly taught and reinforced in a variety of ways in the *iSPIRE* program. A letter or letter group and its corresponding sound might be introduced with an online picture card portraying a key word that will help children remember the letter-sound relationship, as for example, a picture of a goat for the *oa* letter group (representing the long *o* sound). The teacher displays the picture to the students on-screen and explains the new concept, aided by lesson suggestions provided by *iSPIRE*. This initial teaching is carried out in the introductory lesson for the new concept. Later reinforcement lessons build on this initial learning. Students are provided Phonogram Card practice, and then practice with sight words and decodable words, targeted to both the new concept and to reviewing earlier concepts. A key objective, then, is to move from isolated study of the letter and its corresponding sound to its use in richer contexts.

Decoding and word identification are taught in a variety of ways to help meet the specific learning needs of the variety of students in any given classroom. In Step 3—Word Building, students manipulate letter and word cards on the screen (an activity often known as *making words*). In an *iSPIRE* lesson on the short *a* sound, for example, students first use letter tiles pictured on their screens to form the word *bat* by touching the *b* letter tile (or clicking it with a mouse) and dragging it to the first position at the bottom of the screen, then doing the same with *a* and *t*. They then are asked to use the letter tiles to make another word *(hat)*, and so forth *(flat, tab,* and *bag)*. With each word, they finally blend (that is, synthesize) the letters by gliding their fingers under the word and saying it aloud as a whole. Activities like these in the later lesson steps give practice in the concept presented and also reinforce concepts from past lessons.

In Step 4: Decoding and Sentence Reading, students use their devices to code sets of words for various phonic elements, depending on the lesson's purpose. For example, they may use a drawing tool to underline the *a* in *had* and twenty-five other words. At each coding, they segment each sound of the word aloud (while pointing, as a kinesthetic representation of segmentation), then blend the segments to produce the entire word aloud (while gliding their fingers under the word as a kinesthetic representation of synthesizing). Once the work is finished, they submit their work to the teacher, and the teacher is able to toggle between different students' work to observe progress. Step 5: prereading also involves focus on the new concept, though now it is in the context of preparing to read—which they will do in Step 6. For example, a new word to appear in Step 6 may be introduced and examined extensively in Step 5, in terms of its phoneme-grapheme relationships.

Step 7: Sound Dictation provides additional multisensory phonics experiences to the students on the concepts they have learned. The teacher dictates up to ten sounds to students, one sound at a time. Students repeat each sound, then write the corresponding letter or letters either on paper or in the *iSPIRE* workbook. This provides students with kinesthetic/tactile reinforcement.

iSPIRE also utilizes spelling activities to reinforce phonological awareness and decoding abilities. In Step 8, for example, the Prespelling step of the *iSPIRE* daily lesson, students may study the spelling of a concept-related word and relate it to its sounds. Step 9, the Spelling step, calls for explicit instruction and practice in spelling multiple words that include the concept being studied. Students spell the target words on paper or in the *iSPIRE* workbook, providing kinesthetic/tactile reinforcement. While these two activities play an important role in reinforcing phonological awareness and decoding, they also, of course, address students' spelling achievement. Martinez (2011) found that, with ELLs, phonics instruction alone is insufficient to promote spelling ability. Specific attention to spelling, such as that in *iSPIRE's* Steps 8 and 9, is necessary. *iSPIRE's* spelling activities provide that important attention to ELLs and native speakers alike.

A final culminating activity, Step 10: Sentence Dictation, has students demonstrate their concept learning from the lesson by writing sentences on paper, or in their *iSPIRE* workbooks, that have been dictated by the teacher. *iSPIRE* also provides teachers with alternate dictation sentences, covering the same skills, for older students. In addition to the introductory lesson for each concept and the several associated reinforcement lessons, which follow the 10-step *iSPIRE* lesson format, students engage in independent work as well. These activities are fast-paced and closely correspond to the target concept. While much of the time-on-task in these activities is independent, the teacher remains in charge of this time, giving directions, monitoring student responses, and covering key teaching points. For example, in an activity that will involve independent practice in sentence reading of a story and finding words to complete the sentences to drag into their proper locations ("Pam has a bag. The bag is fat."), the teacher scaffolds the assignment by reviewing vocabulary and working with students to demonstrate the activity with the first sentence. Students are then to independently finish the activity on their devices while the teacher observes progress.

Fluency and Automaticity

Samuels (2012) defines fluency as "the ability to decode and comprehend text at the same time" with "accuracy of word recognition, speed of reading, and the ability to read orally with expression" (p. 4). Fluency is often assessed with measurements of oral reading speed in words per minute, with word identification accuracy, and by evaluations of oral reading expression. It is widely recognized as a key objective of reading instruction (International Reading Association and National Association for the Education of Young Children, 1998). The importance of children developing into fluent readers goes well beyond issues of oral reading performance. Fluent reading and effective comprehension go hand in hand (Herbers, et al., 2012). In addition, Hitchcock, Prater, and Dowrick (2004) have reported that improvement in the fluency of learning-disabled first-grade students—as a result of intervention instruction—was accompanied by positive teacher and parent ratings about children's confidence, attention, effort, and reading enjoyment.

Key research in the study of reading fluency has been carried out over a period of decades by S. Jay Samuels (LaBerge & Samuels, 1974; Samuels, 2002, 2012), whose theory of automaticity is closely associated with reading fluency. Automaticity is the ability to recognize words instantly and without significant cognitive effort, thus freeing up the reader to devote cognitive resources to the higher levels of comprehension and thinking. Fluent reading requires this ability to decode words with automaticity (Herbers, et al., 2012; Garcia & Cain, 2014). Jenkins, et al. (2003), and Rasinski, Reutzel, Chard, and Linan-Thompson, (2011), for example, found that poor word identification skills are associated with poor reading fluency.

Samuels's research on automaticity (2002) suggests that young readers proceed through three stages of word recognition development on their way to fluency and comprehension: non-accurate; accurate but not automatic; accurate and automatic. Samuels's third stage is what other researchers have called the Fluency Stage. At the culmination of this stage, students "can read orally with accuracy, speed, and normal expression, as if they were speaking rather than reading from text. When reading from a text, they can decode and comprehend simultaneously" (Samuels, 2002, p. 172).

Failure to achieve fluency in moving through Samuels's first two stages is called dysfluency. There are four key causes of dysfluency. Students, especially those who are struggling with reading, may be forced to move too quickly through the reading curriculum, thus spending an inordinate amount of time trying to read text at their frustration levels. Some approaches to reading may present a limited array of word identification strategies instead of emphasizing flexibility. There may be no effort to help students apply the strategies they have learned in actual reading situations. Finally, and very importantly, some classrooms and homes may not encourage reading.

Fluent reading cannot occur in a vacuum. Children acquire fluency on the basis of a firm foundation of word recognition abilities. Schwanenflugel, et al. (2004) investigated the aspect of fluency called prosodic reading, the ability to read with expression. The study's results found that children with better developed decoding abilities demonstrated superior fluency in their reading.

Children also benefit from the guided transfer of their word recognition abilities to real reading situations. The National Reading Panel (2000), in its recommendations about word recognition instruction, noted that instruction in word recognition "is a means to an end"—that it is essential to ensure that children "know how to apply this knowledge in their reading and writing" (Section 2, p. 96). The panel noted that reading programs must not only focus on word recognition but must provide children opportunities to put their word recognition abilities to use in real reading:

> "Educators must keep the end in mind and ensure that children understand the purpose of learning letter-sounds and are able to apply their skills in their daily reading and writing activities" (Section 2, p. 96).

Fluency and Automaticity in *iSPIRE*

iSPIRE incorporates fluency practice with the study of decoding. Rather than waiting until a time at which all students have mastered decoding to introduce practice in fluency, *iSPIRE* provides daily fluency activities that are integrated with the students' study of decoding so as to allow the students successful experiences in fluent reading. A recent survey of intervention research by Suggate (2016) finds that such "mixed interventions" (that is, interventions like *iSPIRE,* targeting decoding, fluency, and even comprehension) have the highest long-term effectiveness.

The *iSPIRE* curriculum addresses the issue of fluency most directly in Step 6: Reading. Again, actual activities will depend on the lesson level and on where in the introduction-to-reinforcement process the particular segment lies. At an early, introductory level, students may do a word search, then read sentences and carry out analysis activities using their online marking system. For example, they may underline the new sight word *(the)* and circle words illustrating the target concept (for short *a*, *cat*, *rat*, *fast*). This may be a point at which a sight word that does not fit typical phonics patterns (such as *the*) will be taught. In this part of the lesson, students may engage in repeated reading of sentences and, during reinforcing lessons, the reading of a passage. Students are asked to read the passage silently and then to read it aloud several times as they learn to produce it accurately and with good expression and speed. Students also participate in a one-minute timed fluency drill to obtain a words-correct-per-minute score (wcpm) and have the opportunity to practice reading the passage with fluency. In their overview of research, Rasinski, et al. (2011) found that such repeated readings are key to the development of fluency.

Each of the Levels 1–6 of *iSPIRE* includes twenty fully illustrated electronic Decodable Readers, allowing students to apply newly learned concepts to connected, decodable text while promoting enjoyment of the reading process. In their survey of effective reading and writing software, Connor, Goldman, and Fishman (2014) particularly emphasize the positive research carried out with electronic books.

Practice is key to reading fluently, and the *iSPIRE* Decodable Readers provide an excellent way to practice. Valencia and Wixson (2013) suggest that teaching Common Core Foundational

Skills should always include having children read continuous text. The Decodable Readers provide this continuous text at levels with which children can be successful. These *iSPIRE* eBooks can be particularly motivating for struggling readers.

Part of the success of any fluency development program is the ability to provide sufficient instructional scaffolding to ensure student success. A key ingredient of the instructional scaffolding *iSPIRE* provides is the use of decodable text in its readers. Such text ensures that students are not reading at their frustration level, since the phonic elements and words used have been previously taught. If any words may present difficulty for students, they are taught as part of the Prereading activity.

Decodable text is of particular use with children at the developmental levels addressed by the *iSPIRE* curriculum, having "learned enough letter-sound correspondences to begin to sound out words, but not enough to handle the whole range of English patterns presented in uncontrolled text" (Mesmer, 2001, p. 136). The National Reading Panel's (2000) survey of the literature noted that many of the most effective early reading programs used decodable text.

Vocabulary and Comprehension Development

Vocabulary knowledge is essential if students are to make meaning from the printed page; numerous studies reveal that word knowledge and comprehension are inextricably linked. Even students who are skilled in phonics will read with diminished comprehension after third grade unless they are exposed to a wide range of vocabulary words (Chall, Jacobs, and Baldwin, 1990). Students benefit from discussing new vocabulary words before they encounter them in text and from repeated exposure to new words in a variety of contexts (McKeown & Beck, 2011). English language learners especially find technology approaches to learning vocabulary to be helpful toward achievement gains (Connor, Goldman, & Fishman, 2014).

The National Reading Panel (2000) strongly advocates purposeful, goal-centered reading in multiple genres and the express, formal teaching of comprehension strategies. Prereading strategies such as predicting and activation of prior knowledge schemas are also recommended by the NRP. Vacca and Vacca (2013) suggest that the prereading component of a lesson have three purposes: to provide students with purpose and direction, to support them with necessary prior knowledge, and to motivate them to read.

As Pressley has noted, "A good reader does not just dive into a text, proceeding from beginning to end" (2002b, p. 294). Instead, students should be taught to be discerning, active readers. They use their experience and knowledge of the world, their knowledge of vocabulary and language structure, and their knowledge of reading strategies. They should be taught to monitor their understanding of a text. Discussion of the story is guided by teacher questions, one of the comprehension development strategies that is solidly supported by research (National Reading Panel, 2002). Teacher questions do not simply focus on the literal meanings in the story, but help children become more personally involved in the reading by asking higher-level questions, as highlighted by the Common Core State Standards (2010).

Vocabulary and Comprehension Development in *iSPIRE*

The *iSPIRE* curriculum is designed to lead students to apply their decoding ability for comprehension in reading situations. Three major components of the daily lesson plan help students use their word-level learning for the purpose of comprehension: Step 4 (Decoding and Sentence Reading), Step 5 (Prereading), and Step 6 (Reading). Research indicates that combining decoding with more complex tasks results in the maximum increase in reading ability (McArthur, et al., 2015).

Step 4, the Decoding and Sentence Reading step, allows students to use their newly learned decoding and word identification strategies in actual reading. As new decoding strategies are taught, students are heavily scaffolded to insure success in their reading. Reading is provided in individual sentences that help students apply the new strategy and also reinforce previously learned strategies.

Actual vocabulary building occurs in a direct way as students are exposed to unfamiliar words in the context of studying grapheme-phoneme relationships. In a Level 6 lesson on the *oi* diphthong, for example, teachers are given instructional ideas for dealing with vocabulary words such as *turmoil*, *cloister*, and *appoint*.

The Prereading component (Step 5) is a crucial preparatory step for successful reading. This step involves direct instruction and feedback from the teacher. *iSPIRE* teachers prepare students in varying ways depending on the purpose of the lesson. They may review a decoding principle so that it can be applied in an automatic way during the Step 6: Reading/ Reading Comprehension step. In the introductory lesson, students work on their devices with a word find activity, identifying and reading words with elements containing the target concept for the lesson. Results are again submitted to the teacher for review. The students then move on to a blended activity in sentence reading, in which both teacher-led instruction and student online responding play a part.

In the reinforcement lessons for each concept, students read passages of both fiction and nonfiction texts. Texts are not illustrated so that students can focus on application of their concept learning, both the new concept and previously learned concepts, during reading.

There has been some controversy around the Common Core's perceived initial stipulation that students should just jump into a text without any prereading guidance. In response to the controversy, the authors clarified their meaning. One of the concerns was that too much prereading guidance is sometimes given at the expense of students' enjoyment of the story itself. "Preparing students to read a text is perfectly reasonable, and it's compatible with the Common Core State Standards. But such preparation should be brief and should focus on providing students with the tools they need to make sense of the text on their own. Some texts may require providing students with a context to minimize interpretive problems; with other texts, it might make more sense to *not* provide background but to carefully observe as students confront the information, querying them about the potentially confusing stuff and adding any

necessary explanation before a second reading" (Shanahan, 2012/2013). The collection of *iSPIRE* Illustrated Decodable Readers are ideal for this level of prereading guidance.

As each sequence of lessons progresses and student word-level learning becomes more automatic, the reading requirement in Step 6 becomes more sophisticated. Students are prepared to read the story in the Prereading step, then actually carry out a teacher-guided reading of a passage. They continue to be scaffolded by the use of controlled text that provides them with greater potential for successful word identification, and by use of repeated readings. Discussion of the story is guided by teacher questions that do not simply focus on the literal meanings in the story, but help students become more personally involved in the reading by asking higher-level questions. A teacher-led comprehension activity follows, using a specific comprehension skill such as cause and effect, sequencing, or main idea and details. Teachers give a brief explanation of the comprehension skill, and they help students find examples from the story to complete an online graphic organizer.

In addition to the actual lesson components, independent activities for comprehension, reinforcement, and practice are provided. For example, in one lesson, concept pictures (such as a frog, a log, and a fox) are at the top of the page. Students drag the appropriate word from the bottom of the page to the matching picture at the top.

iSPIRE's Teacher Management System

A vital part of *iSPIRE's* intervention program is its online reporting and management system. During specified lesson steps teachers can view student work, during teacher-led instruction, which is useful for real-time monitoring of the intervention and decision-making about pacing of instruction. Concept Assessments at the end of each Reinforcing Lesson demonstrate if students have mastered the lesson concept. The management system organizes, analyzes, and reports data from the assessments. Such technology-supported data systems improve schools' ability to analyze and share information needed for educational decision-making (ERIC Clearinghouse on Disabilities, 2003). It has long been clear that technology is most effective when it is integrated in a seamless manner to support classroom instruction (Dias, 1999; Williams, Rosin, & Hirst, 2011).

Teachers and schools can use the reporting system as a tool for monitoring student progress. The data, reported in tables that are easy for educators and parents to understand, allows schools to identify students who need instructional modifications. The data can also be used to group students who have similar literacy needs, allowing teachers to provide them with differentiated instruction that is targeted to their needs.

iSPIRE's management and reporting system is designed according to federally approved guidelines for data-based decision-making, such as the four-part model prescribed by the ERIC Clearinghouse on Disabilities (2003):

1. Data should be readily available. *iSPIRE* reports can be accessed at any time. In fact, some aspects of the reporting system are designed for actual teacher use during and after each lesson.

2. Procedures for collecting data must be easy to use and not require excessive staff time and resources. *iSPIRE's* collection of data is automatic, requiring no teacher efforts.

3. Purposes for collecting data must be relevant to ongoing activities. In *iSPIRE*, all data collected is directly relevant to the mastery of the target concepts.

4. Only a small number of questions should be addressed. *iSPIRE* does not overwhelm teachers with data. The data collected can be immediately acted upon.

Research on technology-based management systems has been positive. Teachers continue to play the central role in decision-making, able to take the data and interpret and apply it in an informed manner (Wayman, et al., 2007). Systems such as *iSPIRE's*, when used to carry out modifications in instruction, positively impact student learning (Stecker, Fuchs, & Fuchs, 2005). Gehring (2005) notes the importance of such "technologies that help educators analyze student achievement data and then adjust their teaching based on what those results show" (p. 38).

The *iSPIRE* teacher management system functions in four ways. First the teacher has real-time control of pacing during the lesson. The lesson plan is provided on-screen, with appropriate prompts and teachings. Students are actively engaged in responding during each of the steps in the 10-Step Lesson plan. When the response is to be online, the teacher controls when the online activity takes place. Yeh (2009) argues that this type of real-time feedback to the teacher is technology's most important contribution to improving achievement, and Brown and Green (2010) report that the rising popularity of online instruction is primarily due to this kind of management system.

Second, during certain lesson steps the teacher receives real-time feedback on student performance during the lesson in order to monitor how well learning has occurred. Lovell and Phillips (2009/2010) criticize much educational software for its lack of sufficient progress monitoring. Gehring also emphasizes the importance of "technologies that help educators analyze student-achievement data and then adjust their teaching based on what those results show" (2005, p. 38). *iSPIRE's* real-time progress monitoring allows the teacher to quickly gauge individual student performance. At several points in the lesson, the teacher can view student work to see whether students are succeeding in mastering new concepts.

Third, the management system provides data records and aggregated or individual performance reports for perusal after the lesson. The Carnegie Foundation's *Reading Next* report on improving literacy instruction calls for such data collection: "Data should be cataloged on a computer system that would allow teachers, administrators, and evaluators to inspect student progress individually and by class" (Biancarosa & Snow, 2004, p. 19). In *iSPIRE*, this type of data collection allows for a careful, studied analysis of whether students are moving forward adequately in mastering the concepts. The centerpiece of *iSPIRE's* assessment system is the Concept Assessment at the end of each Reinforcing Lesson. These ensure that students have mastered the key concepts in the lesson before moving on to new concepts.

iSPIRE provides four types of assessments that are reported in its online management system. *Pre- and Post-Level Assessments* can be administered at the start and conclusion of each of the six levels to compare gains from instruction. A *Mid-Level Assessment* measures students mastery of taught concepts halfway through each level. *A Concept Assessment* ascertains students' mastery of the lesson concept. *Concept Mastery Fluency Drills* provide teachers with a Correct Words Per Minute (CWPM) score.

Response to Intervention (RTI), Multi-Tier System of Supports (MTSS), and Assessment

Response to Intervention (RTI) is a system for identifying struggling students and a model of instruction that provides support, instruction, and assessment for them. It includes early intervention to prevent reading failure. RTI is a problem-solving approach that utilizes performance data to inform decisions for instruction.

Instead of waiting for students to fail on high-stakes tests before providing services, the Individuals with Disabilities Education Improvement Act (IDEA, 2004) encourages the use of RTI and mandates that schools provide a more intensive level of instruction when a student's response to research-based general classroom instruction is unsatisfactory. As such, RTI is a more sensible plan than past policies for providing prompt help for struggling learners and special education students (Gersten & Dimino, 2006).

RTI is often conceptualized as a three-tier model (Fuchs, Fuchs & Vaughn, 2008; Shores & Bender, 2007).

- Tier 1 students receive core instruction, usually provided to the whole class.
- Tier 2 students receive targeted intervention. Tier 2 instruction is generally supplemental to Tier 1 classroom instruction and is provided in small groups, often within the classroom or a resource room. According to Vaughn and Roberts (2007), as many as twenty to thirty percent of students will require supplemental Tier 2 instruction to address reading/literacy difficulties.

- Tier 3 students need intensive intervention. These interventions involve instruction that may occur in a one-on-one instructional situation in a resource room or clinic setting. Shores and Bender (2007) estimate that five to six percent of students will need this more intensive Tier 3 instruction.

It is common to hear the terms RTI and MTSS used interchangeably. However, the newer MTSS framework, adopted by more than 40 states, is a more comprehensive model, aiming to meet both the academic and behavioral needs of *all* students by providing a continuum of multiple supports. RTI, with its tiered approach to instruction and intervention, where Tier 1 is instruction for all students, is a part of the larger MTTS. This puts *iSPIRE* squarely in place as part of both initiatives (National Center for Learning Disabilities, 2012).

Reading assessment allows us to evaluate and understand the strengths and needs of each student. Recent advances in understanding of educational process have highlighted the importance of assessment to the achievement of students (Gersten, et al., 2008). Part of this new understanding involves the recognition that assessment is only useful if it is used to plan instruction and to revise those plans when the need arises.

> "It is the action around assessment—the discussion, meetings, revisions, arguments, and opportunities to continually create new directions for teaching, learning, curriculum, and assessment—that ultimately have consequence. The 'things' of assessment are essentially useful as dynamic supports for reflection and action, rather than as static products with value in and of themselves" (Darling-Hammond, Ancess, & Falk, 1995, p. 18).

Assessment can be divided into informal and formal assessments to show progress within a program and outside of a program. Informal assessments take place during or at the conclusion of instruction, while formal assessments take place at set, consistent times outside of instruction. Within a program, there are also formative and summative assessments. Formative assessment includes progress monitoring and assures that the instruction meets the student's needs. Summative assessment refers to data gathered at the end of a unit, level, or year to determine the effectiveness of instruction.

Since assessment plays such an important role in teaching and learning, educators have come to recognize several important ways to implement effective assessment systems. An important aspect of an effective assessment system is the provision of multiple measures, a diverse set of assessments designed to provide comprehensive feedback as called for—to give just one example—by the IDEA (2004) guidelines to "use a variety of assessment tools and strategies to gather relevant functional, developmental, and academic information" (614, b, 2). Multiple measures are useful for both RTI placement (Gersten, et al., 2008) and ongoing instructional feedback (Biancarosa & Snow, 2004, p. 19).

RTI, Differentiation, Assessment, and *iSPIRE*

While *iSPIRE* is most appropriate for struggling readers in Tiers 2 and 3, the program has been used in a variety of settings, whether classroom, small group, or one-on-one. The depth, nature, and intensity of skill reinforcement available in *iSPIRE* is unique in educational publishing and provides the resources needed to differentiate instruction. For example, in Lesson 3 of Level 3, the targeted concept is the *ay* letter group. After the *ay* Introductory Lesson, four additional Reinforcing Lessons are provided, each with a reading passage, Independent Work, and extensive practice. A teacher can differentiate instruction by choosing the number of Reinforcing Lessons to use, based on students' individual needs. For example, Tier 2 students may need only the Introductory Lesson and two reviews with Reinforcing Lessons, while Tier 3 students may need all the Reinforcing Lessons. School districts facing serious achievement challenges may use *iSPIRE* to teach entire classes of Tier 1 students. Using *iSPIRE* with groups of struggling readers would be considered Tier 2, and Tier 3 would include students who need intensive one-on-one or small group instruction with *iSPIRE*.

The Common Core State Standards (CCSS) state that instruction should be differentiated. Referring to the Foundational Skills, the CCSS state, "[G]ood readers will need much less practice with these concepts than struggling readers will. The point is to teach students what they need to learn and not what they already know. . . ." (CCSS, p. 15)

Frequent progress monitoring ensures that goals and expectations are clear so that educators can adapt instruction as needed. Most of the assessments in *iSPIRE* are formative—to inform and revise instruction. Only the Post-Level Assessment is summative. All of the assessments provide the opportunities for data collection to support progress monitoring and evaluating instruction.

iSPIRE's use of technology-based lessons and assessments especially fits the needs of struggling readers. In a survey of technology applications that lead to measurable achievement gains, Connor, Goldman, and Fishman (2014) conclude, "There is accumulating research that indicates that technology may be particularly helpful for students who face learning challenges" (p. 595). Shute and Kim (2014) identify technology's ability to provide ongoing formative assessment, as in *iSPIRE*, as one key reason for its effectiveness.

iSPIRE as Intervention for Students with Dyslexia

While dyslexia has long been understood as the specific learning disability related to reading, research over the past 20 years has helped clear up many misconceptions that arose almost one hundred years ago in pre-scientific attempts to address the needs of struggling readers. Many dyslexic students will be classified as Tier 3 readers, an accurate assessment of the serious nature of its effects on learning to read. Many others, however, may have needs that are not so clearly recognized. They may draw upon other strengths to mask their difficulties and be placed in Tier 2 instruction or even in Tier 1, the general classroom (van Viersen, Kroesbergen, Slot, & de Bree, 2016).

In the past 10 years, a grassroots movement, mostly consisting of parents with children who have dyslexia, has been active in alerting state legislators to the needs of dyslexic children. While the movement is not formally organized, a loose network of parents and local and state organizations has come together, working for legislative action, under the name Decoding Dyslexia. Through these or other efforts, some dating back to well before Decoding Dyslexia, some 39 states currently have legislation related to dyslexia, according to the nonprofit organization Dyslexic Advantage (www.dyslexicadvantage.org).

For example, Decoding Dyslexia New Jersey (www.decodingdyslexianj.org) was formed in 2011. Its efforts have led to several educational policies related to dyslexia being implemented by the state legislature, and similar groups have been formed in over 20 states. In 2016, for example, the governor of Missouri signed legislation designed to strengthen the state's policies pertaining to children with dyslexia.

These new legislative directives are beginning to raise schools' awareness of the issues relating to dyslexia. *iSPIRE*, while it is a curriculum that can help with the needs of a wide variety of students, directly addresses the learning needs of dyslexic students with its structured, sequenced, intensive approach to the foundations of reading with which dyslexic students struggle. *iSPIRE* is based on the Orton-Gillingham Approach, a phonics-based, multisensory approach to reading intervention which has a long history of effectiveness with dyslexia. Fortunately, this new attention to dyslexia comes at a time when scientific research, including neurological, brain-based research, has corrected some old, incorrect stereotypes.

The word *dyslexia* comes from the Greek words *dys* (difficult or bad or abnormal, as in *dysfunction, disaster*) and *lexis* (word, or having to do with words or language, as in *lexicon*). It is often defined as a brain-based, or neurological, condition, and some research on it uses functional magnetic resonance imaging of the brain. Dyslexia is usually distinguished from reading difficulties arising from instructional circumstances, inadequate intelligence, and factors related to social, economic, and cultural issues.

In 1993, Castles and Coltheart looked at the many symptoms identified by researchers and educators as resulting from dyslexia (such as impairments in spelling or phonological processing or auditory processing or short-term memory or morphological awareness or rapid naming—and many others). They suggested that there is more than one subtype of dyslexia, a suggestion that was followed by a barrage of research studies purporting to identify one or more of the subtypes.

One theory that became predominant, though by no means undisputed, was the phonological deficit hypothesis. This viewpoint was advocated by two influential researchers, Keith Stanovich (Metsala, Stanovich, & Brown, 1998) and Frank Vellutino (Vellutino, Fletcher, Snowling, & Scanlon, 2004). This theory suggested that dyslexia resulted from difficulties in abilities to manipulate the sounds of language. A typical phonological awareness task is to ask a student to "Say the word *fork*. Now take the first sound in *fork* and replace it with the first sound of the word *pickle*. What is the new word?"

Yale University's Sally Shaywitz has continued advocacy of the phonological deficit theory in her best-seller, *Overcoming Dyslexia* (2003).

Another dominant theory of the underpinnings, or etiology, of dyslexia is the double-deficit hypothesis (Wolf & Bowers, 1999). Advocates of this theory agreed with Stanovich and Vellutino that phonological deficits could be one type of dyslexia, but they also suggested that rapid automatized naming (RAN) could be another type and that both together (the double-deficit) resulted in the worst symptoms of the three. A typical RAN task is to provide a child with a row of pictures and use a timer to determine how long it takes the child to name them all. This is seen as a speed-of-cognition task.

Still yet others emphasize that dyslexia involves dysfunctions in either auditory or visual processing. Advocates of this position find support for their ideas both in brain imaging studies that find some anomalies in readers' activation of auditory or visual brain systems. They also draw conclusions that students who differentially have weaknesses in sight word development or phonics development suffer from dysfunctions in visual or auditory processing, respectively.

Other researchers, such as Tamboer, Vorst, and Oort (2016), continue to find evidence that there is only one type of dyslexia. Such researchers usually focus their research studies on trying to identify test batteries that will accurately indicate whether a child has dyslexia.

While there is no shortage of researchers and educators who have strong opinions on the existence of various dyslexia subtypes, a more perceptive conclusion for now is drawn by Ramus and Ahissar: "The large body of data on cognitive deficits in dyslexia fails to fit a single coherent theoretical framework" (2012, p. 105). Even brain imaging studies, which have received a great deal of media, need a tremendous amount of refinement before they will be of help in providing definitive answers.

The actual final conclusions as to the etiology and brain structure of dyslexia may be some years (or decades) in the future. The good news is that the instructional implications of addressing the needs of dyslexic students are much clearer, though they are challenging for parents, students, teachers and schools alike.

In fact, the basic principles of intervention with dyslexia are much the same as those discussed earlier in this paper's discussion of the needs of struggling readers in general and of how *iSPIRE* is designed to meet those needs: Explicit instruction, systematic instruction, and sequenced instruction. A key difference has to do with the intensiveness of instruction: Dyslexic students (or Tier 3 students) need engagement in highly intensive instruction. They need sequenced repetition and practice, carried out in a varied and engaging manner that continues until they demonstrate mastery. They also need highly effective instructional methods, the multisensory strategies that take advantage of visual, auditory, and kinesthetic/tactile learning. As noted earlier, there is a strong history of research that supports these instructional policies struggling students, those that are at the heart of *iSPIRE*, which is an approach based on seminal ideas of Samuel Orton and Anna Gillingham. Research specifically

on students classified as dyslexic also supports these policies, as does research showing that broadening instruction beyond simply phonics to include other aspects of the reading process (such as whole words, vocabulary, comprehension), as happens in *iSPIRE*, is maximally effective (McArthur, et al., 2015).

While spelling presents a challenge for all students, and *iSPIRE* includes spelling activities as part of its fast-paced, intensive 10-Step Lesson Plan, spelling for students with dyslexia presents particular challenges. The cognitive demands of spelling slow down the writing of dyslexic students. Spelling affects their word choices during writing, and results in both slower writing time and poorer quality (Sumner, Connelly, & Barnett, 2016). *iSPIRE's* inclusion of attention to spelling is an important facet of its program when working with students who have dyslexia.

Conclusion

The past forty years have seen researchers in the field of reading and literacy provide a rich array of studies that can guide teachers in their choice of curricula. The *iSPIRE* blended learning curriculum is based on the most solid findings of these research studies in its direct, systematic, and sequential approach to guiding students in literacy acquisition. Students are led to proficiency in the foundations of reading through teacher-based and technology-based instruction in letter identification and phonological awareness. At the same time, they are guided to apply their learnings to the higher-level skills involved in word identification and the end goals of fluency and comprehension.

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References

Adams, M. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.

Balajthy, E., & Lipa-Wade, S. (2003). *Struggling readers: Assessment and instruction in grades K–6*. New York: Guilford Press.

Biancarosa, C., & Snow, C. E. (2006). *Reading next: A vision for action and research in middle and high school literacy: A report to Carnegie Corporation of New York (2nd Ed.)*. Washington, DC: Alliance for Excellent Education.

Bond, G. L., & Dykstra, R. (1997). The Cooperative Research Program in first-grade reading instruction. *Reading Research Quarterly*, 3, 348–427. Originally published 1967.

Brady, S. (2012). Taking the Common Core Foundational Standards in Reading far enough. *Perspectives on Language and Literacy, 38*, 19–30.

Brown, A., & Green, T. (2010). Issues and trends in instructional technology: Growth and maturation of web-based tools in a challenging climate; Social networks gain educators' attention. In Orey, M., Jones, S. A., & Branch, R. M. (Eds.), *Educational media and technology yearbook* (Vol. 35, pp. 29–43). New York: Springer.

Cardullo, V. M., Wilson, N. S., & Zygouris-Coe, V. I. (2015). Enhanced student engagement through active learning and emerging technologies. In Keengwe, J. (Ed.), *Handbook of research on educational technology and active learning* (pp. 1–18). Hershey, PA: Information Science Research.

Carver, R. P. (2000). *The causes of high and low reading achievement*. Mahwah, NJ: Lawrence Erlbaum.

Castles, A., & Coltheart, M. (1993). Varieties of developmental dyslexia. *Cognition, 47*, 149–180.

Chall, J. (1983). *Stages of reading development*. New York: McGraw-Hill.

Chall, J. S. (1996). *Learning to read: the great debate* (3rd ed.). New York: Harcourt Brace. Originally published 1967.

Chall, J. S., Jacobs, V., & Baldwin, L. (1990). *The reading crisis*. Cambridge, MA: Harvard University Press.

Clarebout, G., Elen, J., Jiang, L., Lust, G., & Collazo, N. A. J. (2014). Support device usage. In Spector, J. M., Merrill, M. D., Elen, J., & Bishop, M. J. (Eds.), *Handbook of research on educational communications and technology* (4th ed., pp. 519–527). New York: Springer.

Common Core State Standards Initiative. (2010). *Common core state standards for English language arts & literacy in history/social studies, science, and technical subjects*. Washington, DC: National Governors Association Center for Best Practices and the Council of Chief State School Officers.

Connor, C. M., Goldman, S. R., & Fishman, B. (2014). Technologies that support students' literacy development. In Spector, J. M., Merrill, M. D., Elen, J., & Bishop, M. J. (Eds.), *Handbook of research on educational communications and technology* (4th ed., pp. 591–604). New York: Springer.

Craig, S. (2003). The effects of an adapted interactive writing intervention on kindergarten children's phonological awareness, spelling, and early reading development. *Reading Research Quarterly,* 38, 438–440.

Darling-Hammond, L., Ancess, J., & Falk, B. (1995). *Authentic assessment in action: studies of schools and students at work*. New York: Teachers College Press.

Dias, L. B. (1999). Integrating technology. *Learning and Leading with Technology, 27*, 10–13, 21.

ERIC Clearinghouse on Disabilities and Gifted Education. (2003). Using data: *Innovative ways to improve results for students with disabilities*. Research connections in special education, No. 13. Arlington, VA: Office of Special Education Programs (OSEP).

Every Student Succeeds Act. P. L.114–95, 114–231. 2015.

Fuchs, D., Fuchs, L.S., & Vaughn, S. (Eds.). (2008). *Response to intervention*. Newark, DE: International Reading Association.

Garcia, J. R., & Cain, K. (2014). Decoding and reading comprehension: A meta-analysis to identify which reader and assessment characteristics influence the strength of the relationship in English. *Review of Educational Research Online First,* 84, 74–111.

Gehring, J. (2005). Big-district priorities. *Education Week Technology Counts*, 24, 38–39.

Gersten, R., Compton, D., Connor, C. M., Dimino, J., Santoro, L., Linan-Thompson, S., and Tilly, W. D. (2008). *Assisting students struggling with reading: Response to intervention and multi-tier intervention for reading in the primary grades. A practice guide*. (NCEE 2009-4045). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

Gersten, R., & Dimino, J. A. (2006). RTI (Response to Intervention): Rethinking special education for students with reading difficulties (yet again). *Reading Research Quarterly,* 41, 99–108.

Herbers, J. E., Cutuli, J. J., Supkoff, L. M., Heistad, D., Chan, C-K., Hinz, E., & Masten, A. S. (2012). Early reading skills and academic achievement trajectories of students facing poverty, homelessness, and high residential mobility. *Educational Researcher,* 41, 366–374.

Hiebert, E. H., & Pearson, P. D. (2012–2013). What happens to the basics? *Educational Leadership*, 70, 48–53.

Hitchcock, C. H., Prater, M. A., & Dowrick, P. W. (2004). Reading comprehension and fluency: Examining the effects of tutoring and video self-modeling on first-grade students with reading difficulties. *Learning Disability Quarterly*, 27, 89–103.

Individuals with Disabilities Education Improvement Act (IDEA) of 2004. Federal Register 71 614 (b) (6) (2004).

International Dyslexia Association. (1997). *Informed instruction for reading success: Foundations for teacher preparation. A position paper of the IDA*. Baltimore, MD: International Dyslexia Association.

International Dyslexia Association. (2009). *IDA Position Statement: Dyslexia treatment programs.* Baltimore, MD: IDA.

International Reading Association. (1997). *The role of phonics in reading instruction: A position statement of the IRA*. Newark, DE: IRA.

International Reading Association. (1998). *Phonemic awareness and the teaching of reading: A position statement of the Board of Directors*. Newark, DE: IRA.

International Reading Association. (2009). *New literacies and 21st century technologies: A position statement*. Newark, DE: IRA.

International Reading Association and National Association for the Education of Young Children. (1998). *Learning to read and write: Developmentally appropriate practices for young children. Joint position statement*. Newark, DE: IRA and NAEYC.

International Reading Association. (2012). *Literacy implementation guidance for the ELA Common Core State Standards*. Newark, DE: IRA.

Jamaludin, K. A., Alias, N., & Johari, R. (2014). Research and trends in studies of phonological knowledge and reading development: A review of selected journals. *The Malaysian Online Journal of Educational Science,* 2, 27–36.

Jenkins, J. R., Fuchs, L. S., van den Broek, P., Espin, C., & Deno, S. L. (2003). Sources of individual differences in reading comprehension and fluency. *Journal of Educational Psychology*, 95, 719–729.

Kulik, J. (1994). Meta-analytic studies of findings on computer-based instruction. In E.L. Baker & H.F. O'Neil (Eds.), *Technology assessment in education and training* (pp. 9–33). Hillsdale, NJ: Erlbaum.

LaBerge, D., & Samuels, S. J. (1974). Toward a theory of automatic information processing in reading. *Cognitive Psychology*, 6, 293–323.

Leppanen, U., Niemi, P., Aunola, K., & Nurmi, J. (2004). Development of reading skills among preschool and primary school pupils. *Reading Research Quarterly*, 39, 72–93.

Lovell, M., & Phillips, L. (2009/2010). Commercial software programs approved for teaching reading and writing in the primary grades: Another sobering reality. *Journal of Research on Technology in Education,* 42, 197–216.

Lyon, G. R. (1998). *Overview of reading and literacy initiatives*. Washington, DC: National Institute of Child Health and Human Development.

Martinez, A. M. M. (2011). Explicit and differentiated phonics instruction as a tool to improve literacy skills for children learning English as a foreign language. *GIST Education and Learning Research Journal,* 6, 25–49.

Mayer, R. E. (2014). Multimedia instruction. In Spector, J. M., Merrill, M. D., Elen, J., & Bishop, M. J. (Eds.), *Handbook of research on educational communications and technology* (4th ed., pp. 385–399). New York: Springer.

McArthur, G., Castles, A., Kohnen, S., Larsen, L., Jones, K., Anandakumar, T., & Banales, E. (2015). Sight word and phonics training in children with dyslexia. *Journal of Learning Disabilities,* 48, 391–407.

McCulley, L. V., Katz, S., & Vaughn, S. (2013). Reading instruction and students with learning disabilities. In J. P. Bakken, F. E. Obiakor, A. F. Rotatori (Eds). *Learning disabilities: Practice concerns and students with LD* (pp. 19–44). Bingley, United Kingdom: Emerald Group.

McKeown, M. G., & Beck, I. L. (2011). Making vocabulary interventions engaging and effective. In R. E. O'Connor, & P. F. Vadasy (Eds.), *Handbook of reading interventions* (pp. 138–168). New York: Guilford.

Mesmer, H. A. E. (2001). Decodable text: A review of what we know. *Reading Research and Instruction*, 40, 121–142.

Metsala, J. L., Stanovich, K. E., & Brown, G. D. A. (1998). Regularity effects and the phonological deficit model of reading disabilities: A meta-analytic review. *Journal of Educational Psychology,* 90, 279–293.

Morris, D., Bloodgood, J. W., Lomax, R. G., & Perney, J. (2003). Developmental steps in learning to read: A longitudinal study in kindergarten and first grade. *Reading Research Quarterly,* 38, 302–328.

National Center for Learning Disabilities. (2012) *Issue brief: Multi-tier system of supports a.k.a. response to intervention (RTI)*, Washington, DC: NCLD.

National Reading Panel. (2000). *Report of the National Reading Panel: Reports of the subgroups*. Washington, DC: National Institute of Child Health and Human Development Clearinghouse.

NICHD Early Childhood Care Research Network. (2004). Multiple pathways to early academic achievement. *Harvard Educational Review,* 74, 1–29.

Nichols, W. D., Rupley, W. H., Rickelman, R. J., & Algozzine, B. (2004). Examining phonemic awareness and concepts about print patterns of kindergarten children. *Reading Research and Instruction*, 43, 56–81.

O'Connor, R. E. (2011). Phoneme awareness and the alphabetic principle. In R. E. O'Connor & P. F. Vadasy (Eds.). *Handbook of reading interventions* (pp. 9–26). New York: Guilford Press.

Oudeans, M. K. (2003). Integration of letter-sound correspondences and phonological awareness skills of blending and segmenting: A pilot study examining the effects of instructional sequence on word reading for kindergarten children with low phonological awareness. *Learning Disabilities Quarterly*, 26, 258–280.

Pressley, M. (2002). Effective beginning reading instruction. *Journal of Literacy Research,* 34, 165–188.

Ramus, F. & Ahissar, M. (2012). Developmental dyslexia: The difficulties of interpreting poor performance, and the importance of normal performance. *Cognitive Neuropsychology,* 29, 104–122.

Rasinski, T. V., Reutzel, D. R., Chard, D., & Linan-Thompson, S. (2011). Reading fluency. In M. Kamil, D. Pearson, E. Birr Moje, & P. Afflerbach (Eds.), *Handbook of Reading Research* (Vol. 4, pp. 286–319). New York: Routledge.

Russell, T. L . (1999). *No significant difference phenomenon*. Raleigh, NC: North Carolina State University.

Samuels, S. J. (2002). In A. E. Farstrup & S. J. Samuels (Eds.), *What research has to say about reading instruction* (3rd ed., pp. 166–183). Newark, DE: International Reading Association.

Samuels, S. J. (2012). Reading fluency: Its past, present, and future. In T. Rasinski, C. Blachowicz, & K. Lems (Eds.), *Fluency instruction: Research-based best practices* (2nd ed., pp. 3–16). New York: Guilford.

Schwanenflugel, P. J., Hamilton, A. M., Kuhn, M. R., Wisenbaker, J. M., & Stahl, S. A. (2004). Becoming a fluent reader: Reading skill and prosodic features in the oral reading of young readers. *Journal of Educational Psychology,* 96, 119–129.

Shanahan, T. (2012/2013) *The Common Core ate my baby and other urban legends. Educational Leadership,* 70, 10–16.

Shanahan, R., & Beck, I. (2006). Effective literacy teaching for English-language learners. In D. August & T. Shanahan (Eds.), *Developing literacy in second-language learners: Report of the National Literacy Panel on language minority children and youth*. New Jersey: Lawrence Erlbaum.

Shaywitz, S. (2003). *Overcoming dyslexia*. New York: Knopf.

Shores, C., & Bender, W. N. (2007). *Response to intervention: A practical guide for every teacher*. Thousand Oaks, CA: Corwin Press.

Shute, V. J., & Kim, Y. J. (2014). Formative and stealth assessment. In Spector, J. M., Merrill, M. D., Elen, J., & Bishop, M. J. (Eds.), *Handbook of research on educational communications and technology* (4th ed., pp. 311–321). New York: Springer.

Snow, C., Burns, M. S., & Griffin, P. (1998). *Preventing reading difficulties in young children*. Washington, DC: National Academy Press.

Staker, H. (2011). *The rise of K–12 blended learning: Profiles of emerging models*. Lexington, MA: Christensen Institute.

Stecker, P. M., Fuchs, L. S., & Fuchs, D. (2005). Using curriculum-based measurement to improve student achievement: Review of research. *Psychology in the Schools,* 42, 795–819.

Suggate, S. P. (2016). A meta-analysis of the long-term effects of phonemic awareness, phonics, fluency, and reading comprehension interventions. *Journal of Learning Disabilities,* 49, 77–96.

Sumner, E., Connelly, V., & Barnett, A. L. (2016). The influence of spelling ability on vocabulary choices when writing for children with dyslexia. *Journal of Learning Disabilities,* 49, 293–304.

Tamboer, P., Vorst, H. C. M., & Oort, F. J. (2016). Five describing factors of dyslexia. *Journal of Learning Disabilities,* 49, 466–483.

U.S. Department of Education, Office of Planning, Evaluation, and Policy Development. (2009). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*. Washington, DC: USDOE.

U.S. Office of Education. (2004). *Questions and answers on No Child Left Behind—reading*. Washington, DC: USOE.

Vacca, R. T., & Vacca, J. L. (2010). *Content area reading: Literacy and learning across the curriculum* (11th ed.). New York: Pearson.

Valencia, S. W., & Wixson, K. K. (2013). CCSS-ELA: Suggestions and cautions for implementing the reading standards. *The Reading Teacher,* 67, 183.

Van Viersen, S., Kroesbergen, E. H., Slot, E. M., & de Bree, E. H. (2016). High reading skills mask dyslexia in gifted children. *Journal of Learning Disabilities,* 49, 189–199.

Vaughn, S., & Roberts, G. (2007). Secondary interventions in reading: Providing additional instruction for students at-risk. *Teaching Exceptional Children,* 39, 40–46.

Vellutino, F. R., Fletcher, J. M., Snowling, M. J., & Scanlon, D. M. (2004). Specific reading disability (dyslexia): What have we learned in the past four decades? *Journal of Child Psychology and Psychiatry,* 45, 2–40.

Wagner, R., & Ridgewell, C. (2009). A large-scale study of specific reading comprehension disability. *Perspectives on Language and Literacy,* 35, 27–31.

Wayman, M. M., Wallace, T., Wiley, H.I., Ticha, R., & Espin, C. A. (2007). Literature synthesis on curriculum-based measurement in reading. *The Journal of Special Education,* 41, 85–120.

Williams, T., Rosin, M., & Hirst, M. W. (2011). Gaining ground in the middle grades. *Education Outlook,* 1, 1–5.

Wolf, M., & Bowers, P. G. (1999). The double-deficit hypothesis for the developmental dyslexias. *Journal of Educational Psychology,* 91, 415–438.

Woodward, J., & Rieth, H. (1997). A historical review of technology research in special education. *Review of Educational Research,* 67, 503–536.

Yeh, S. S. (2009). Class size reduction or rapid formative assessment? A comparison of cost-effectiveness. *Educational Research Review,* 4, 7–15.

Zhao, Y., Lei, J., Yan, B., Lai, C., & Tan, H. S. (2005). What makes the difference? A practical analysis of research on the effectiveness of distance education. *Teachers College Record,* 107, 1837–1884.