Twelve Compelling Principles from the Research on Effective Phonics Instruction

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The topic is seemingly simple—phonics. Do children need instruction in phonics? Why is there an argument? The answer is "yes." Even children who "crack the code" early and appear to have noticed letter-sound relationships and figured out how to use them will benefit from systematizing their knowledge and developing effective, efficient ways to use their knowledge not only of letters and sounds, but also of patterns involving larger chunks of words. At the bottom line, the more rapidly and efficiently children can decode words, the more accurate and fluent their reading will be, making it possible to give greater attention to comprehension and deeper thinking.

There are two extreme arguments regarding literacy instruction: (1) Children should have only phonics instruction and a certain kind of phonics instruction at that. (2) Children do not need phonics instruction but can discover the "code" through meaningful reading and writing. We are all for meaningful reading, and we support carefully planned and sequenced, directly taught phonics. That is, the design for literacy learning across the grades cannot be one-dimensional, or even one with a smattering of this and that. Children need numerous opportunities to hear written language read aloud, to read and talk about books with others, to choose and read books independently, and to write daily in a variety of genres. They also need the experience of isolating the building blocks of language—letters and sounds—studying them, making connections between them, seeking patterns and using them, and becoming so familiar with this content that, eventually, they can use it easily, rapidly, and automatically. This process takes years. All of these opportunities require the support of skilled instruction. Students must have strong foundational skills and daily opportunities to apply the skills within reading and writing.

> For definitions of important terms related to phonics, see page 18.

A solid plan for high-level literacy competencies includes direct, systematic phonics instruction within a comprehensive literacy design that must also include reading high-quality books aloud to children, engaging them in shared reading, interactive-read aloud, small group guided reading instruction, small group book clubs, independent choice reading, and a wide range of writing contexts that support the expansive knowledge of words and how words work.

The instructional design of phonics becomes even more critical when we consider the large number of English learners in our schools. It is our responsibility as educators to assure equity and access to language for all students. English learners have an important strength. They can build on their knowledge of one or more other languages to use as an asset as they begin to take on an additional language. "These active constructive learners are not accounted for by the empty vessel metaphor in education which suggests that the role of teachers is to pour learning into children" (Clay 1991). They may or may not have the understandings we outline below related to their own language(s), which may not be alphabetic in form. But now they are faced with learning to talk, read, and write in English, and it is our educational responsibility to make that experience meaningful. Imagine if you knew only a few words in another language and did not know how to string those words together in meaningful sentences. Children may see learning sounds and letters as a game and yet have little idea as how to apply it as readers

and writers. These learners need a robust, meaningful, comprehensive literacy program that includes rich phonics instruction and much more.

TWELVE COMPELLING PRINCIPLES FROM RESEARCH

In this document we will explore the important findings—twelve compelling principles—from a large body of research. These principles rest on decades of research on literacy instruction and how literacy and language develop in children over time, as well as on more than thirty years of our own extensive experience in classrooms across the country. A high-quality phonics design is based on what we know about how children learn to read, and it continuously expands their knowledge about words and how they work. (An essential foundation for the implementation of such a design is the teacher's understanding of the content to be taught— the complexity and structure of language.)

Below, we summarize the 12 compelling principles drawn from our examination of the research.

1 Explicit phonics instruction is effective when taught in a sequence that ranges from simple to more complex in a cumulative process.

2 Effective instruction assures that children develop strong phonological awareness, including awareness of individual phonemes or sounds, in the first two years of schooling.

3 Children need to learn how to look at print and to name the individual symbols.

4 Instruction that includes helping children learn that letters and sounds are connected in a systematic way (the alphabetic principle) is essential.

5 Effective phonics instruction includes synthetic approaches (moving through words sound by sound and/or letter by letter) and analytic approaches (noticing parts and patterns in words to take words apart).

6 Noticing and seeking word patterns and their relationships to sounds helps readers and writers expand their word-solving ability.

7 Children need to learn the structure of words as well as how to use this knowledge flexibly to take words apart while reading.

8 Readers and writers need a repertoire of known words so that problem solving takes place against a background of accurate reading.

9 Readers and writers need a flexible range of in-the-head strategic actions to apply as they read or write. These actions include the ability to solve words but also to comprehend and read with fluency.

10 Effective word study instruction includes robust teaching of vocabulary and spelling across the grades.

11 Written language is complex; it is essential for teachers to understand the simple and complex relationships between graphic symbols and phonemic elements, as well as base words, word roots, and etymology.

12 An effective literacy design includes explicit phonics instruction and takes place within a comprehensive approach so that learners have ample opportunities to apply their understandings as they engage in meaningful reading and writing.

1   **Explicit phonics instruction is effective when taught in a sequence that ranges from simple to more complex in a cumulative process.**

Explicit teaching of phonics means specifically planned and sequenced lessons that focus on the elements of written language. In any learning experience (including phonics, spelling, word study, and vocabulary instruction), it is important to proceed with a carefully constructed series of experiences from simple to complex. In this way, learning is cumulative. Learners take on a simple concept and use that knowledge and/or skill as a step to take on a more complex concept. In an effective phonics/vocabulary program, this process is not left to accident but goes according to a superbly designed sequence. It takes time, which means that lessons must be conducted daily over many years of learning.

Consider the following nine areas of learning:

1. **Early Literacy Concepts** (knowledge of how print works)

2. **Phonological Awareness** (ability to hear sounds in words)

3. **Letter Knowledge** (recognition of graphic symbols and their names)

4. **Letter-Sound Relationships** (ability to connect sounds to letters and letters to words)

5. **Spelling Patterns** (recognition of phonograms, letter clusters, vowel patterns)

6. **High-Frequency Words** (ability to read words quickly and accurately that appear often in the language and/or are high utility)

7. **Word Meaning/Vocabulary** (understanding the meanings of words and of meaning-bearing parts {morphology, etymology})

8. **Word Structure** (ability to break down words into parts—base words, word roots, affixes—to solve them)

9. **Word-Solving Actions** (the ability to use a flexible range of strategies for solving words).

Though the first three categories of word learning are typically "mastered" in the early years of classroom instruction, the learning continues—simple to complex—across the six others. It is the task of the designer of the system to conduct a detailed linguistic analysis of conceptual learning within each area and to create a logical one that will be cumulative, while at the same time recognizing that learning in one area supports learning in others. The design of phonics instruction is multi-dimensional.

We recognize that not all children follow the same precise path of learning, so teaching must be responsive to assure that their strengths are noted as well as their needs. But efficiency in teaching requires a carefully drawn plan that the teacher can adjust in response to student need.

RESEARCH EVIDENCE

- Early and systematic phonics instruction results in better achievement in reading than later and less systematic phonics instruction (Chall 1967).

- "Findings provided solid support for the conclusion that systematic phonics instruction makes a bigger contribution to children's growth in reading than alternative programs providing unsystematic or no phonics instruction" (NICHD 2001a).

- "Systematic and explicit phonics instruction makes a bigger contribution to children's growth in reading than instruction that provides non-systematic or no phonics instruction" (Armbruster et al. 2006, 12).

- Between 1932 and 1936, Dr. Orton, Cheshed, Cole, Dozier, and Gillingham were part of the Language Research Project of the New York Neurological Institute. During this time of research, they determined that children benefit from an instructional approach of written language that is structured, sequential, and multisensory (Orton, et al. 1932–1936).

2 Effective instruction assures that children develop strong phonological awareness, including awareness of individual phonemes or sounds, in the first two years of schooling.

The phonological system is the sound system of language—what you say and hear. Figure 2 shows five observable units and elements of oral language, all of which are useful to the young child as he begins to read and write. For young children, a great deal of phonological awareness (PA) is developed through shared reading of poems, songs, and stories. They find pleasure in rhyme, rhythm, assonance, alliteration, and words for sounds (like *pop*). They become aware that words are made up of sounds that people make with their mouths and tongues, and they learn that words are made up of sequences of these sounds. They learn to say, hear, and notice when words end or begin alike. This kind of instruction is highly intentional rather than incidental because teachers cue children to listen for certain elements, such as clapping when you hear a rhyme or noticing when two words sound the same at the beginning.
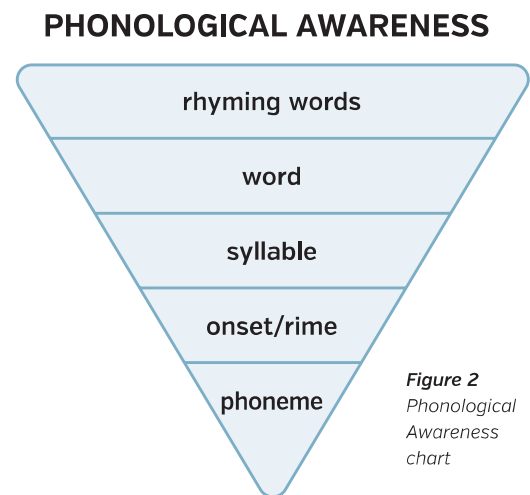
PHONOLOGICAL AWARENESS

Figure 2
Phonological Awareness chart

RESEARCH EVIDENCE

- "The results clearly showed that PA instruction is effective in teaching children to attend to and manipulate speech sounds in words. Findings of the meta-analysis revealed not only that PA can be taught but also that PA instruction is effective under a variety of teaching conditions with a variety of learners (NICHD 2001a).

- There is converging evidence from both experimental and longitudinal studies conducted in several countries that some form of phonemic awareness is necessary to successfully learn to read alphabetic languages (Blachman and James 1985; Bradley and Bryant 1983; Elkonin 1963, 1973; Fox and Routh 1975; Juel et al. 1986; Lundberg, Oloffson, and Wall 1980; Share,

Jorm, Maclean, and Matthews 1984; Tornrus 1984; Tunmer and Nesdale 1985; Williams 1984).

- "If children are to benefit from phonics instruction, they need phonemic awareness. The reason is obvious: children who cannot hear and work with the phonemes of spoken words will have a difficult time learning how to relate these phonemes to the graphemes when they see them in written words" (Armbruster et al. 2006, 1).

- "In the NRP analysis, studies that spent between 5 and 18 hours teaching phonemic awareness yielded very large effects on the acquisition of phonemic awareness. Studies that spent longer or less time than this also yielded significant effect sizes, but effects were moderate and only half as large. Transfer to reading was greatest for studies lasting less than 20 hours. In fact effect sizes were more than twice as large for shorter programs than for the longest-lasting programs" (NICHD 2001a, 2–42).

- Phonics instruction is not effective unless children have (or quickly develop) some phonemic awareness at the beginning of first grade (Juel, et al. 1986).

- Ursha Goswami demonstrated that even young and inexperienced readers were able to make analogies between known and unknown print words when the words shared common letters in the same sequence such as *cart* and *smart*. She also found that children were better at making analogy between word parts that form rimes, such as *eat* at the end of *meat* instead of similar letters at the beginning of words such as *meat* and *mean* (1986).

3 **Children need to learn how to look at print and to name the individual symbols.**

Children need to learn how to look at print and name the individual symbols. In English, all written language is represented by an alphabet of just twenty-six letters, an amazing invention. To adults, these forms seem easy to distinguish, but to a beginner they are quite difficult (for example *n, h*). Children must learn to recognize the distinctive features of letters, the very slight differences that make one letter different from all others, before they can attach names to the letters or associate sounds with them. Children also need to learn that directionality can create differences (for example, *u* contrasted with *n*, or *b* as opposed to *d*). These understandings are different from almost any they have met previously. Consequently, attention to letters is a staple of an effective literacy design.

In addition to learning to recognize letters, young children need to understand how letters are arranged in print to create meaningful written language, and that is not easy because the rules are different for different languages. In English, letters are organized into words with spaces on either side and placed in lines with spaces between them. You read left to right and top to bottom, always sweeping back to the left to begin a line. Punctuation and capitalization help the reader to recognize meaningful sentences. The writer, then, must produce written language in this form. Many children need specific instruction in all of the ways that "print works," and if there is confusion, it may block other learning. Early literacy experiences must include close attention not only to letters but also to those same forms within continuous text.

- "Without fluent control over letters in all their detail, distinct challenges arise for young learners as they attempt to read and write words" (Kaye and Lose 2018).

- "It is important for students to know the names of nearly all the letters of the alphabet. Knowing the letter names is a first step in phonics instruction and is associated with later success in reading" (International Literacy Association 2018).

- "It is essential to teach letters as well as phonemic awareness to beginners. PA training is more effective when children are taught to use letters to manipulate phonemes. This is because knowledge of letters is essential for transfer to reading and spelling" (NICHD 2001a).

- "Directional behaviors manage the order in which readers and writers attend to anything in print. Gaining control of them is a foundational step in literacy as oral language is matched to written language" (Clay 2001, 118).

- "The ability to identify words in a text as individual nameable objects appears to be a 'watershed event' in learning to read…Children who can identify individual words in text learn words and are able to segment by phoneme with astonishing accuracy. It seems to me that the notorious difficulty prereaders have with tasks of [phoneme segmentation] hinges on this phenomenon. It is not that prereaders cannot discriminate phonemes or learn so-called letter sounds; in fact, they must in order to speak. It is simply that, lacking a stable concept of a word as a bound figure with a beginning and end, they cannot know where to focus their attention" (Henderson 1980, 9–10).

- "When children are read to, and with explicit instruction at home and school, they develop concepts of print that can be expansive, such as learning the purposes of writing and illustrations; understanding what an author is; and identifying text features including the front and back of a book, uppercase and lowercase letters, reading top to bottom, reading left to right, return sweep at the end of a line, and the meaning of punctuation" (International Literacy Association 2018).

- Readers go through many stages of reading development, beginning with pre-reading. Pre-reading involves pretending to read, identifying the letters of the alphabet, writing their own name, understanding the purpose of reading, and some phonological awareness skills such as rhyming and alliteration (Chall 1983).

4 Instruction that includes helping children learn that letters and sounds are connected in a systematic way (the alphabetic principle) is essential.

> " A graphic form (letter) that a person can see or write is related to a specific sound (phoneme) that a person can say and hear.

Children may be able to recite favorite rhymes and identify rhyming words. They may be able to say the alphabet and even to identify most of the letters. But the important elemental connection they need to make is this: A graphic form (letter) that a person can see or write is related to a specific sound (phoneme) that a person can say and hear. Children also need to learn that sometimes a letter can be related to more than one sound and that sometimes a sound may be represented by different letters. As they learn more, children will realize that a sound may be represented by a cluster of letters or a word part and that letters represent different sounds depending on the context and meaning of the word. In other words, in English, letters and sounds are related in both simple and highly complex ways (for example, the long a sound may be represented by –a, –ai, –ay, –aigh, and –et). These complexities are the result of changes as the language has evolved throughout history. For many children, this big idea is learned easily because they are immersed in sounds and letters together. But for some, a longer period of time may be needed. All children benefit from systematizing what they are learning about language. As learners go through the grades, they recognize the more complex ways that letters and sounds are related.

RESEARCH EVIDENCE

- "When students understand that letters represent sounds and have mastered several letter-sound correspondences, they have acquired the alphabetic principle. With this principle, in tandem with the concept of word in text in place, they begin to finger-point, read and remember written words" (International Literacy Association 2018).

- "Knowing how letters correspond to phonemes and larger subunits of words is essential for enabling beginning readers to sound out word segments and blend these parts to form recognizable words. Alphabetic knowledge is needed to figure out new words by analogy and to help beginners remember words they have read before. Knowing letter-sound relations also helps children to be more accurate in predicting words from context. In short, knowledge of the alphabetic system contributes greatly to children's ability to read words in isolation or connected text" (NICHD 2001a).

- "Phonological awareness, particularly at the phoneme level, has a direct role in many components of literacy development including decoding and spelling. There is a link between phoneme-level awareness and decoding and encoding in alphabetic writing systems because graphemes (letters) represent phonemes (sounds) in written words. That is, phoneme-level awareness, in conjunction with alphabet knowledge, enables children to understand how graphemes are mapped onto phonemes and blended to form spoken words (Adams 1990; Sharem 1995). Additionally, PA has an indirect effect on reading comprehension because decoding skill is related to reading fluency, which, in turn, aids comprehension (LaBerge & Samuels, 1974; Storch & Whitehurst, 2001)" (International Literacy Association 2020).

- In order for individual words to be represented in memory, beginning readers are thought to form connections between graphemes and phonemes in the word. These connections bond spellings to their pronunciations in memory (Ehri 1992; Ehri and Wilce 1987a; Rack, Hulme, Snowberg, and Wightman 1994; Reitsma 1983).

5 **Effective phonics instruction includes synthetic approaches (moving through words sound by sound and/or letter by letter) and analytic approaches (noticing parts and patterns in words to take words apart).**

Synthetic instruction involves teaching children the relationships between the letters and sounds and ensuring that children notice all letters in a word. The reader smoothly blends the sounds that are represented in the word (in sequence) to say the word. This is commonly called "sounding out," because the reader says the sounds of every letter or letter combination. Problems can arise when there are silent letters or structures such as *–er* and *–ing* where every letter is not sounded in the usual way. Analytic instruction involves noticing parts and patterns in words to take words apart. Problems can arise when the reader uses parts but cannot respond when a more precise breakdown to identify phonemes in all positions is required. Readers and writers can use both analytic and synthetic skills and can learn when they need to apply each in a strategic and efficient way.

RESEARCH EVIDENCE

- The members of the National Reading Panel examined a large number of studies to compare three types of phonics programs: (1) synthetic phonics in which students were taught to convert letters into sounds and then to blend the sounds for form recognizable words; (2) larger-unit phonics programs that emphasized the analysis and blending of larger subparts of words such as onsets, rimes, phonograms, spelling patterns as well as phonemes; and (3) programs that taught phonics systematically but used a mix of methods. Analysis of the effect sizes indicated that all are more effective than non-phonics programs and there was no significant difference between them (NICHD 2001a, 2–132).

- The National Reading Panel found that synthetic, analytic, and miscellaneous phonics programs all had positive effect sizes on reading growth that did not differ statistically from one another. "The conclusion supported by these findings is that various types of systematic phonics approaches are significantly more effective than non-phonics approaches in promoting substantial growth in reading" (NICHD 2001a, 2–93).

- Kaye's study of proficient second-grade readers indicated that they had more than sixty ways to solve words and, although they would blend individual sounds across words, they tended to work with larger word units rather than "sounding out" a word letter-by-letter (although they could). Many of the methods were unique to particular children at a particular point in time (Kaye 2006).

- "In a study by Ehri and Wilce (1987b), kindergartners were taught individually how to generate phonemic spellings of words and nonwords by segmenting words into phonemes and selecting letters representing those phonemes…On post-tests after training, effect sizes

were large on measures of segmentation and spelling…These findings indicate that teaching children to segment and spell helps them learn to read as well as spell words" (NICHD 2001a, 2–39).

- "…phonics instruction significantly improved performance on all of the outcome measures examined, not only word reading and spelling but also text processing…The strongest effects occurred on measures of decoding regularly spelled words (d = 0.67) and pseudowords (d = 0.60). These effects were statistically larger than effects observed on the other measures which did not differ from each other. This indicates that phonics instruction was especially effective in teaching children to decode novel words, one of the main goals of phonics" (NICHD 2001a, 2–113).

6 Noticing and seeking word patterns and their relationships to sounds helps readers and writers expand their word-solving ability.

Explicit lessons will make children aware of phonogram patterns that help them to connect words that sound alike at the end. They can make new words by substituting first, middle, or last letters. Noticing and using these patterns gives children power over words.

There are seventy to seventy-five basic phonogram patterns in English words, and the ability to notice these patterns helps readers to solve words rapidly and efficiently. Children typically learn these basic patterns in the first two years of school, although they may continue to accumulate knowledge of more complex patterns in subsequent years. At first, they learn the patterns in one-syllable words and become adept at relating them (in what are sometimes called "word families") by connecting words and substituting letters at the beginning, middle, or end to make new words. Later, when children encounter the same patterns in syllables of multisyllable words, they are able to break them down.

RESEARCH EVIDENCE

- "Skillful reading depends upon thorough familiarity with individual letters, words, and frequent spelling patterns. Only to the extent that we have developed such familiarity can the written word flow effortlessly from print to meaning" (Adams 1990).

- Uta Frith noted that the transition between a visual and an alphabetic stage depends on awareness of relationships between sounds and letters. Her proposal is a three-phase theory characterized by different word reading strategies: (1) a logographic phase when readers recognize words on the basis of distinctive visual or contextual features; (2) an alphabetic phase when readers use spelling-sound rules to read words; (3) an orthographic phase when words are recognized by larger spelling patterns, especially morphemic units (1985).

- Clay (1979) writes, "A strategy of analyzing spoken words into sounds, and then going from sounds to letters may be a critical precursor of the ability to utilize the heuristic tricks of phonics" (p. 66).

- "Poor decoding skill leads to little reading and little opportunity to increase one's basic vocabulary and knowledge through reading, leaving a shaky foundation for later reading comprehension" (Juel 1988).

7   Children need to learn the structure of words and to use this knowledge flexibly to take words apart.

Children learn early that words are made up of parts (syllables), and over time they need to learn that these word parts are a key to solving words in reading and to spelling words in writing. Words are made up of base words or root words, prefixes, and suffixes that can change the word's spelling, meaning, and part of speech. Rather than attempting to solve compound words and other multisyllable words as "wholes," readers and writers need to break them down, to understand how the parts function in the word, and to use the parts both to decode (pronounce) the word and to derive the word's meaning. This process should become automatic. When a reader meets a new multisyllable word, she immediately starts to take it apart; likewise, when a writer attempts a new multisyllable word, she says it in parts and represents it that way. This breaking down and building up process allows the reader/writer to use basic phonics principles.

RESEARCH SUPPORT

- Most children need explicit teaching that focuses their attention to the use of letters, sounds, and word parts to solve words (Adams 1990; Armbruster, Lehr, and Osborn 2001; Clay 1991, 1998, 2001; Juel 1988; Juel, Griffith, and Gough 1986; Moats 2000; National Institute of Child Health and Human Development 2001; Pressley 1998; Snow, Burns, and Griffin 1989).

- "Decoding automaticity is rooted in the reader's cumulative knowledge of spelling–sound correspondences. Over time, as the product of their cumulative decoding experience, readers progressively refine their phonological sensitivity even as common pronunciations of word parts become tied to common spellings. As this knowledge grows in breadth and depth, it provides a support structure by which nearly every new word is partly learned already, enabling readers to read and spell new words with ease and to retain them distinctly" (Adams 2011).

- Carlisle analyzed 16 studies about the relation of morphological awareness instruction to key components of literacy development. The findings showed that instruction about word parts was associated with improvements in word reading and spelling, and in determining the meaning of unfamiliar words (2010).

- A significant body of research indicates that instruction of prefixes is beneficial, and many vocabulary researchers recommend instruction of the most common prefixes as the first and best component of word analysis (Graves, 2004; Carlisle, 2007). White, Sowell, and Yanagihara (1989) found that 20 prefixes account for almost 97% of the 2,959 prefixed words that most frequently appear in school reading materials. Given how often these 20 prefixes occur, it makes sense to teach their meaning and use.

- "By using word roots and various morphemic elements, readers can make connections to determine the meaning of new words" (Edwards et. al 2004).

- Direct instruction of morphology is an effective means to help with understanding and applying word structure for decoding, spelling, and vocabulary study (Wilson, 2005).

Specifically, students can be taught strategies to segment or manipulate words according to their affixes and roots. As a result, students may be able to recognize an unfamiliar word simply by identifying the affixes and the remaining base word or root (Carreker, 2005).

- It was found that children need to learn the common rules of the English language and older students need to learn a variety of syllable patterns and common prefixes and suffixes, then Latin and Greek word parts (Orton, et al. 1932-1936).

8 Readers and writers need a repertoire of known words so that problem solving takes place against a background of accurate reading.

A reader learns words and a writer uses words in two ways. (1) A reader or writer may use phonics skills—from simple to complex—to decode or spell a word. He then encounters the word again and again and places it into a state of recognition. From then on, the individual does not have to "sound out," "make connections," "break the word down," or use other strategies because the word is known. (2) A reader or writer may encounter a word many times and see it as a whole pattern (for example, *the*, which is difficult for a beginner to apply phonics relationships but easy to remember as a pattern). This happens at early levels with high-frequency words, which are very useful in giving the beginner a "leg up" in reading and writing. After several encounters, the reader remembers the pattern, and the word is known. Neither process should be described as "look say," a method in which the reader learns all words by visual memory.

Noticing and acquiring words is a learning process. The repertoire of known words is important in several ways:

- Known words allow readers and writers to move along with the process, experiencing the ability to read continuous text with fluency.

- Known words provide examples that readers and writers can later use as recognizable patterns in solving more complex words (e.g., *the, then, when, whenever*).

- Known words free attention for problem solving against a backdrop of accurate reading/ writing.

- Known words free more attention for comprehension.

Some phonics programs place great emphasis on what are called decodable texts, within which language is manipulated so the reader is presented only with phonograms he has studied. We find this practice unnecessary when carefully constructed and sequenced higher quality texts are created. Books that are designed for beginning readers include many simple words that are easy to decode and linked to phonics instruction, as well as some words (such as *said* and *the*) that make the language more comprehensible.

- In their 2000 report, the National Institute of Child Health and Human Development identified three elements as foundation skills: phonemic awareness, knowledge of high-frequency sight words, and decoding skills. These foundational skills are generally developed in the primary grades, but many intermediate students may need further work on them (NICHD).

- "The recognition of a large number of words by sight has an enormous impact on students' reading fluency" (McLachlan, Nicholson, Fielding-Barnsley, Ohi and Mercer 2013).

- Children's knowledge of other print words helps with unfamiliar print words more than letter-phoneme correspondences. Moustafa did a study of first graders and found that their knowledge of common high-frequency words (e g. *the, big, old, blue*) accounted for 95 percent of the unusual words they said correctly. For example, the child who could read *red* and *blue* could pronounce *rue* correctly. Children's knowledge of letter-phoneme correspondences accounted for only 64 percent of the words they could pronounce correctly (1997).

- "It seems clear that early efficient word recognition leads to better comprehension than does the reverse order (Calfee & Piontkowski, 1981; Lesgold, Resnick, & Hammond, 1985)" (Juel 1988).

- "Automaticity with the 1,000 most-frequent words is not reached until the fourth-grade by the 40th percentile and fifth-grade by the 25th percentile...There is sufficient evidence to conclude that the frequency with which letter-sound correspondences, rimes, and words appear in texts influences the accuracy and speed of recognition of words by beginning readers" (Hiebert and Martin 2008).

- "In this view (Ehri and 1998, 1999, 2002), each phase of reading development is characterized by the predominant type of connection that bonds written words to their other identities in memory: (1) pre- alphabetic, involving visual and contextual connections, (2) partial alphabetic, involving connections between more salient letters and sounds, (3) full alphabetic, involving complete connections between all the graphemes in spellings and phonemes in pronunciations, and (4) consolidated alphabetic, involving connections formed out of syllabic units. Whereas connections during Phase 1 are linked to the meanings of words, connections in subsequent phases are grounded in pronunciations. Decoding skill emerges in Phase 3 and enhances the quality of memory for sight words (Ehri 2005).

- In the construction of their Interactive Strategies Approach to tutoring, designed for beginning struggling readers, Vellutino and Scanlon write that English "contains a fair number of irregularly spelled words that do not lend themselves to phonological decoding (e.g., *said, was, there*), we assume that beginning readers must acquire alternative and complementary strategies for identifying unfamiliar words encountered in written text, including rote memorization of those words as sight words, decoding them by analogy with known words (e.g., known *sight* decode *might*), and use of picture clues and sentence contexts to aid identification" (2002, 578).

- The most recent study of decodable texts found that students who read the more interesting "low decodable" texts did much better on both the decodability and reading comprehension tests than the students reading the "high decodability" texts (Price-Mohr and Price).

- In a 1985 study conducted by Juel and Roper/Schneider, it was discovered that decoding ability did not differ between a group of students that used decodable texts to those who did not. The students using decodable texts did no better than the control group on a test of reading comprehension and vocabulary or on a test of decoding ability by the end of the study (Juel, Roper 1985).

- A 2004 study found that students taught phonics using decodable texts did not differ on any posttest scores in comparison to the control group of students reading storybooks written without phonetic control (Jenkins, Peyton, Sanders and Vadasy).

9 Readers and writers need a flexible range of in-the-head strategic actions to apply as they read or write. These actions include the ability to solve words but also to comprehend and read with fluency.

The goal of all reading is effective, efficient "in the head" systems for processing written text with understanding and fluency. The goal of all writing is to use knowledge of letters, sounds, and words to produce comprehensible language. The goal of all writing is expression of meaning. Readers read to understand meaning, and writers write to express meaning. Without meaning, there is no purpose. Children must have the opportunity to construct meaning as they read and as they write, and that means that comprehension is always present. Readers use many sources of information including meaning, language structure, and phonological and graphophonic details. Readers need to self-monitor using their knowledge of letters and sounds, and they need to learn how to correct their errors.

Literacy, at the bottom line, is not a mechanical process. Readers use everything they know about language both to decode words and to check on their accuracy. They are flexible in their actions. They try things out. They make hypotheses. It is demeaning to call these richly based attempts "guesses" instead of valuable cognitive acts. The reader is working it out and—as a result—is building a network of effective in-the-head word-solving actions. Every individual makes progress by recognizing her mistakes and searching for and using more information to achieve accurate, meaningful reading and spelling.

RESEARCH EVIDENCE

- Although students increase their array of competencies over time, they take "different paths to common outcomes" (Clay 2001, 6).

- A child who is building an effective literacy processing system independently monitors her own reading and writing, searches for information using the meaning and grammatical structures in text, and uses print (words, letters, letter clusters, and punctuation) to make discoveries, notice errors, take un-prompted action to correct those errors, and problem solve flexibly (Clay 2015b; Doyle 2013; and Lose 2018).

- Kaye's study of proficient second-grade readers indicated that they had more than sixty ways to solve words and tended to work with larger word units rather than "sounding out" a word letter-by-letter (although they could). Many of the methods were unique to particular children at a particular point in time (Kaye 2006).

- Pressley (2005) discovered that skilled readers have metacognitive habits of mind and are "massively active as they read and continuously responded to ideas in text" (294).

- Second-grade children are able to "execute metacognitive strategies" (Pressley et al. 1983, 277). Pressley's data suggested that young readers must learn how to monitor their own learning. This monitoring must not be taught as skill drills in isolation of actual text reading but rather taught directly during actual reading experiences. (Ghatala, Levin, Pressley and Lodico 1985; Pressley et al. 1983).

10 Effective word study instruction includes robust teaching of vocabulary and spelling across the grades.

Initially, the young child uses everything he knows about regular letter-sound relationships as he works to spell words in writing and often produces partially correct attempts. So, in a piece of writing from a kindergartener or a first grader you might see words such as *mows* (mouse) or *hom* (home) that reveal the child's development of understanding at a particular point in time. It is an approximation on its way to correctness. We would not want this kind of spelling to continue for the long term. Poor spellers in upper elementary grades write words in a highly phonetic way. Phonics must include the complexities mentioned in principle 5 as well as the kind of structures discussed in principle 7 so that writers have a repertoire of knowledge to guide the accurate spelling of complex words.

Vocabulary, too, is an important key element of comprehensive phonics design. From the beginning, the number of words in the child's oral vocabulary is important in making it easier to process texts with understanding. As readers and writers go deeper into the structure of words, they make connections between base words, prefixes, and suffixes. They learn by studying the origin of words, including Greek and Latin roots, and recognize how words are related in meaning. This advanced word study greatly expands their ability to read and understand scientific and other content words. As students read and write more complex texts, the phonics design should increase emphasis on formal study of word meanings, but an inquiry approach is more effective than "memorize and drill." Taken together, instruction in spelling and vocabulary assure students' use of the conventions of written language.

RESEARCH EVIDENCE

- "Repeated exposure to vocabulary items is important for learning gains. The best gains were made in instruction that extended beyond single class periods and involved multiple exposures in authentic contexts beyond the classroom" (NICHD 2000).

- "Specific word instruction, or teaching individual words, can deepen students' knowledge of word meanings. In-depth knowledge of word meanings can help students understand

what they are hearing or reading. It also can help them use words accurately in speaking and writing" (Armbruster, Lehr and Osborn 2006, 30).

- "The review of studies of morphological awareness and of cognates indicate that explicit instruction is needed for students to develop their capacity to expand their vocabularies on the basis of morphological characteristics" (Hiebert and Lubliner 2008).

- "…the most critical factor beneath fluent word reading is the ability to recognize letters, spelling patterns, whole words, effortlessly, automatically, and visually. Moreover, the goal of all reading instruction—comprehension—depends critically on this ability" (Adams 1990).

- "…spellings of specific words are connected to their pronunciations in memory. Readers use their knowledge of the alphabetic system to create these connections. They know how to distinguish separate phonemes in pronunciations and separate graphemes in spellings. They know grapheme–phoneme correspondences. More advanced readers know larger graphosyllabic units as well (e.g., –ing). When readers encounter a new written word and recognize its pronunciation and meaning, they use their alphabetic knowledge to compute connections between graphemes and phonemes. Reading the word just once or a few times serves to bond the spelling to its pronunciation along with its other identities in memory" (Ehri 1992).

- The size of a student's vocabulary in primary schooling is a significant predictor of reading comprehension and academic achievement in secondary school as well as later vocational success (NICHD 2000).

- Blachowicz and Fisher reviewed two decades of research on vocabulary and suggest that instruction should actively involve students in understanding words and build multiple ways to learn. Students should be immersed in words, have repeated exposure to them to deepen learning, and make connections between words, for example "mapping" (505). Also, they need explicit instruction on how to use context to derive the meaning of words (2000).

11 Written language is complex; it is essential for teachers to understand the simple and complex relationships between graphic symbols and phonemic elements, as well as base words, word roots, and etymology.

Being knowledgeable about the acquisition of decoding strategies, vocabulary expansion, and spelling techniques should help a teacher be more strategic and efficient. It will increase confidence and the ability to work in a flexible way with students. It underlies the ability to observe closely and to be responsive to them rather than following a program in a rote or robotic way. Having phonics understandings is necessary, but it is not a sufficient way to improve the effectiveness of literacy teaching. Applying logic to this issue would indicate that it's difficult for anyone to teach something that they don't know very well. Having linguistic knowledge must be a positive element in a teacher's repertoire and most experts agree with that logic and we support it, as well. The effect of a phonics course has not been accurately measured; however, most teacher preparation programs include one and many states require

the entire primary teaching staff to take a web-based phonics course to demonstrate their content knowledge.

RESEARCH EVIDENCE

- Converging evidence also indicates that teachers benefit from extensive, ongoing professional learning (NCTE 2013; Lovejoy, Szekely, and Wat 2013).

- "Becoming an effective transactional strategies instruction teacher takes several years" (Brown et al. 1996, 20).

- "Teachers need to recognize the vital role of word recognition skills in early reading acquisition and development—how phonological awareness and the alphabetic principle are at the very foundation of learning to decode accurately and, later, how phonologic, orthographic, syntactic, and semantic knowledge lead to automatic and fluent reading which, in turn, leads to making meaning from text. However, merely recognizing the critical role that language, text structure, and vocabulary development play in both word recognition and comprehension is not enough. Teachers need the associated content knowledge to support children as they develop reading skills…Thus, teacher professional development that cultivates detailed knowledge of the English speech sound system and its production can help teachers provide effective instruction in important elements of beginning reading" (Cunningham et al. 2009).

- Without adequate training, teachers' sense of efficacy in their jobs is most certainly diminished (Moats 1994; Soodak and Podell 1993; Zigmond 1993).

- "A growing research literature on teachers' knowledge indicates that teachers often do not understand the system of phoneme-grapheme correspondences, the phonological system of English, the difference between a morpheme and a syllable, the structure of English grammar, or even the differences between expository and narrative texts" (Moats and Foorman 2003).

12 **An effective literacy design includes explicit phonics instruction and takes place within a comprehensive approach so that learners have ample opportunities to apply their understandings as they engage in meaningful reading and writing.**

Explicit phonics lessons are more effective when children are highly engaged through elements of inquiry (seeking connections and patterns) and kinesthetic application activities in which they work "hands on" with letters, sounds, word parts, and words. In addition, there should be explicit links to reading and writing in other contexts.

Explicit phonics instruction without the opportunity to engage in purposeful and joyful reading and writing is a barren curriculum. If children spend months, even weeks, drilling on skills (and for some, the only continuous texts they see are so highly contrived that they are virtually meaningless), then the meaning and purpose of written language will not be available to them. A coordinated, related, and connected set of instructional practices assures that

children not only learn phonics, decoding, word analysis, vocabulary, and spelling skills, but also that they experience their use through engagement in meaningful written language on a daily basis. This process increases their skills and creates complex systems of thinking so that every time they read or write they not only use but also expand what they know.

RESEARCH EVIDENCE

- "The vast majority of the studies indicated that approaches including intensive, explicit phonics instruction resulted in comprehension skills that are at least comparable to, and word recognition and spelling skills that are significantly better than those that do not. . . Approaches in which a systematic code instruction is included with meaningful connected reading resulted in superior reading achievement overall" (Adams 1990).

- Pearson found that explicit teaching of reading skills is most effective when it is embedded in the context of meaningful reading (Pearson 2004).

- "Along with phonics instruction, young children should be solidifying their knowledge of the alphabet, engaging in phonemic awareness activities, and listening to stories and informational texts read aloud to them. They also should be reading texts (both out loud and silently), and writing letters, words, messages, and stories" (Armbruster et al. 2006 14).

- "It is important to emphasize that systematic phonics instruction should be integrated with other reading instruction to create a balanced reading program" (NICHD 2001a, 2–97).

- During a 1998 study it was found that the highest achieving classrooms were those that included both phonics skills instruction along with holistic experiences at his or her competency level (Wharton-McDonald, Pressley, et al).

- "Excelling at word recognition, spelling, and vocabulary is not just a matter of memorizing isolated rules and definitions. The best way to develop fast and accurate perception of word features is to engage in meaningful reading and writing and to have multiple opportunities to examine those same words and word features out of context. The most effective instruction in phonics, spelling, and vocabulary links word study to the texts students are reading, provides a systematic scope and sequence of word-level skills, and provides multiple opportunities for hands-on practice and application" (Bear, Invernizzi, Templeton and Johnston 2012).

CONCLUSION

We started with a question. The answer is "yes," but not a simple yes. Exploration of the role of phonics instruction in successful reading is ongoing, but there is compelling evidence that literacy acquisition is not a simple process. Learning to read is complex and individual, especially for children who struggle. Clay (1979) has called the acquisition of a literacy processing system "the patterning of complex behavior." Even from the beginning, the young child is putting together various sources of information in a complex cognitive process—some partly innate, as they learn language, and some acquired as part of a literate culture.

Becoming literate is an enormous achievement; and, for most children, one that requires the assistance not only of a skillful and knowledgeable teacher, but the support of a literacy learning community in schools and classrooms. That is true over years of instruction; young people's school and life careers as well as quality of life depend on their being able to articulate thinking in talking and writing. Our conclusion from this examination of research is that everything must work together so that literacy learners steadily expand their power to competently use and enjoy written language.

Important Terms

ALPHABETIC PRINCIPLE: The concept that there is a relationship between the spoken sounds in oral language and the graphic forms in written language.

ETYMOLOGY: The history, or origin, of a word and how its meanings have developed over time.

GRAPHEME: A letter or cluster of letters representing a single sound, or phoneme: e.g., *a*, *eigh*, *ay*.

MORPHOLOGICAL AWARENESS: The recognition, awareness, and use of units of meaning in words.

MORPHOLOGY: The combination of morphemes (building blocks of meaning) to form words; the rules by which words are formed from free and bound morphemes–for example, root words, prefixes, and suffixes.

ONSET AND RIME: In a syllable, the part (consonant, consonant cluster, or consonant digraph) that comes before the vowel in a word is an onset, e.g., the *cr* in *cream*. In a syllable, the ending part containing the letters that represent the vowel sound and the consonant letters that follow is a rime, e.g., *dr-eam*.

PHONEMIC (or PHONEME) AWARENESS: The ability to hear individual sounds (phonemes) in words and to identify and make particular sounds.

PHONETICS: The scientific study of speech sounds—how the sounds are made vocally and the relation of speech sounds to the total language process.

PHONICS: The knowledge of letter-sound relationships and how they are used in reading and writing. Teaching phonics refers to helping children acquire this body of knowledge about the oral and written language systems; additionally, teaching phonics helps children use phonics knowledge as part of a reading and writing process.

PHONOLOGICAL AWARENESS: The awareness of words, rhyming words, onsets and rimes, syllables, and individual sounds (phonemes).

SPELLING PATTERNS: Beginning letters (onsets) and common phonograms (rimes), which form the basis for the English syllable. Knowing these patterns, a student can build countless words.

SYLLABICATION: The division of words into syllables.

WORD MEANING/VOCABULARY: *Word meaning* refers to the commonly accepted meaning of a word in oral or written language. *Vocabulary* often refers to the words one knows and understands in oral or written language.

WORD STRUCTURE: The parts that make up a word.

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