

PRINT-TO-SPEECH AND SPEECH-TO-PRINT: MAPPING EARLY LITERACY

Recently there have been many discussions among academics about the “Science of Reading.” Such discussions advance science which is constantly evolving over time, but in the meantime, what’s a practitioner on the front lines to do? Teachers need clarity, not confusion, about how to deliver the evidence-based and meaningful instruction that we know can bring 90-95% of students to grade-level reading.

While reading is a complex endeavor, one area of confusion seems to be in how to teach the foundational skills usually occurring from pre-K to Grade 1 or 2. As concerned researchers and practitioners, we offer a brief summary of what we consider most important in early instruction to reach this critically important goal for our children and for our society.

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The new mastering of literacy is built upon the continuing mastery of spoken language that children develop while listening to others and expressing their own ideas and feelings. As they listen to interesting books being read, as they carry on conversations and discuss topics of interest, children are strengthening spoken language pathways in the brain. Effective literacy instruction gradually maps new neural networks intimately interlocked with these speech networks. With modeling and explicit, systematic instruction, reading and writing skills develop together over time as children gain knowledge of the world, grow vocabularies, and expand their understanding of how spoken words are represented in print.

Early literacy benefits from both print-to-speech and speech-to-print instruction, creating connections in the brain that link new knowledge about the alphabet to what children already know and are continuously learning about words—their pronunciation, their meaning, and their use.

Understanding the alphabet code. *Children cannot become skilled readers by memorizing the visual appearance of words or by using cues like pictures to guess at written words.* They need to understand that the alphabet is a *code*, to learn to use it to make their own spoken words visible (*en-code*), and to figure out words that someone else has written (*de-code*).

Letters represent the individual sounds we say and hear when we pronounce a word. When we learned to speak, we didn't need to be aware of saying separate sounds in words (*phonemes*). However, to use the alphabet as a code for those spoken sounds, children need to become conscious of each phoneme they say as they pronounce a word. This essential skill is known as *phoneme awareness (PA)*. To master the alphabet code, it is important to develop an automatic ability to identify these speech sounds (around forty in English) and link them to letters or combinations of letters (*graphemes*). An understanding of this process helps teachers guide children's learning with explicit and systematic instruction. Weakly developed PA is consistently associated with poor reading and spelling. Present evidence supports PA instruction in segmenting and blending for all early readers, and more intensive instruction for struggling readers. Teachers should tailor instruction whenever possible to the needs of individual students.

Segmenting and encoding spoken words. When children are told that the letter M stands for the sound "mm," they understand that a letter stands for a sound that they say and hear. However, to read and spell a word like MAT, children also must *recognize* that they are saying three different sounds when they say the word MAT. Spelling words requires focusing on the pronunciation of each sound as the word is segmented. The crucial and most difficult step is becoming aware of the full sequence of sounds as a word is spoken so that those speech sounds can be linked to letters and used to spell out a meaningful word. Segmenting the word's sounds is not easy for many students and must be learned through instruction and practice, until it becomes automatic. Phoneme awareness and segmenting should be taught in parallel with letter knowledge and phonics instruction. If children segment a familiar word like MAT in order to spell it, the speech sounds get linked to concrete letters that are used to make that spoken word visible. The visible letters they assemble or write can help them to retain the memory of pronouncing that sound. The physical act of writing also adds more motor learning to these multi-modal links. This process is called *encoding*.

Introducing speech-to-print and print-to-speech together. Children do not need to learn the names, shapes, and sounds of all 26 upper- and lower-case letters before they tackle the construction of real words. Children as young as four can develop PA and practice a few phoneme-letter pairs as they learn to encode simple consonant-vowel-consonant (CVC) words. Using letters to spell meaningful words is physically engaging and constructive. For example, children might begin by listening to a sentence with the word "cat" in it. Then they can be shown how to segment "cat" into its sounds and use movable alphabet tiles to spell CAT. They can point to the letters as they *blend* them back into the word "cat." A new word "mat" can be used in a sentence, segmented, spelled, decoded, and connected to meaning in the same way. Now the M can be removed from MAT leaving AT. When children proceed to try the word SAT, they should be asked what sound they are saying at the beginning of the word "sat." At this point, children need to say the word "sat," and try to identify the first sound they are saying *on their own*. This process may need repetition and scaffolding at first.

As they learn their letter-sounds, children begin to choose the letters and spell out the words by themselves. *They are turning words they can say into words they can see.* As they read back the word that they have spelled, children are also practicing decoding. Some children may need more deliberate steps to encoding by practicing oral segmenting and blending of spoken words, or by manipulating blank tiles before tackling letters. By mastering both functions of the alphabet code (encoding and decoding), children may be surprised to discover that they can independently read and write real words.

Segmenting and spelling their own spoken words, then blending those letter sounds back into spoken words, contributes powerfully to skilled reading. It is important that children know the meaning of the words they are learning to encode and decode. Through these activities, they are developing linked pathways in the brain connecting what they already know about words (their pronunciation, meaning and use) with the new symbols used for reading and writing. They can listen with pleasure to books with rich vocabularies and exciting stories that you read and discuss with them, and tackle more decodable books on their own.

Recognizing repeated patterns. It is possible for children to “discover” on their own some of the rules involved in how spoken words are made visible. A few children seem to learn to read with little or no systematic instruction. They have learned to master the code through other sources—a helpful adult, software, TV—and generalize the patterns they recognize to figure out how letters stand for the sounds they say and hear. However, for many children this implicit learning that involves recognizing patterns does not come easily, and they will need more intensive and explicit instruction, and time for practice. Patterns are recognized when they are repeated over and over. Introducing too many words that are not regularly spelled, like SAID or WAS, can interrupt the process of noticing the regular patterns of spelling. As children learn to encode and decode, it is helpful to work with regularly spelled words as much as possible.

Spelling words phonetically. Once children grasp the concept that letters stand for sounds that they say, whether in English or other European languages, they begin to figure out that they can write any word they can say. As they learn to express their own ideas on paper, they will spell words phonetically for a while, practicing PA and phonics as they write. Spelling corrections can be made as they write to dictation, and orthographic patterns can be introduced gradually, so that a child’s early pleasure in writing is not dampened by too many “mistakes.” Time for encoding/writing should be scheduled daily.

Developing automatic word recognition. Brain research shows that early reading requires development of neural pathways linking speech to new learning about print. Memorizing the visual appearance of words does not require the same participation of speech. More efficient brain pathways develop as children master PA, phonics, the alphabet code, and word knowledge in order to encode and decode meaningful text. These networks will be elaborated over time as new words, (their pronunciations, spellings, usage, and sometimes multiple meanings) are mapped and stored. When these neural maps are created and repeated, familiar words are *no longer decoded intentionally, but are recognized automatically.* Introducing morphemes to change words like PLAY into PLAYS, PLAYER, PLAYED, PLAYING, can dramatically increase the number of words that are recognized automatically.

Mastering the early foundation skills of letter recognition, PA, word knowledge, decoding, and encoding, requires conscious attention and effort at first. Like learning to ride a bicycle, with practice these skills become automatic and unconscious for most children. Automaticity with a code requires both encoding and decoding. When both become proficient and automatic, reading and writing enable a lifetime of enjoyment and learning. In summary, it is our view that early literacy, like breathing, requires equal measures of *in* and *out*: both print-to-speech *and* speech-to-print instruction.