Teaching Foundational Reading Skills to Students With Intellectual Disabilities

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Table 1 **Elements of Explicit Instruction**

Element	Description
Step-by-step demonstration (I do)	Model the steps to perform the skill or strategy. Use clear and concise instructional language.
Guided and supported practice (We do)	Provide guidance and support as student performs the skill. Provide corrections and feedback; reteach when necessary. Gradually decrease the level of support as student gains independence.
Independent practice (You do)	Monitor student's initial attempts to perform the skill alone. Step in as necessary to ensure the skill is performed correctly. Have student continue to practice until the skill can be performed automatically and independently.

It was late May and Mrs. Larkin was getting ready to attend an individualized education program (IEP) meeting for her student, Molly, who has Down syndrome. Mrs. Larkin, a veteran first-grade teacher, was worried about Molly's lack of progress in reading, and she knew that Molly's parents were also concerned. Although Molly had entered first grade knowing all of her letter names and most letter sounds, she was still unable to apply these skills to decoding words. The special education teacher, Mr. Peet, had been pulling Molly out of class during the language arts block for individual instruction, and Molly had made a lot of progress in reading sight words. In fact, she had mastered most of the sight words on the Grade 1 list. Unfortunately, she had made almost no progress with blending sounds to form words.

At the last team meeting, Mr. Peet suggested that they switch from a phonics-based reading approach to a functional sight-word approach for Molly. He stressed how much easier it was for Molly to learn to read whole words and how important it was for Molly's future independence to have a functional sight-word vocabulary. Although these arguments seemed logical, Mrs. Larkin was troubled by the fact that a functional sight-word program would limit Molly's ability to grow as a reader; there is a finite number of words a person can memorize. Mrs. Larkin and Mr. Peet decided to do some research on reading instruction for students with intellectual disabilities (ID) before Molly's next IEP meeting.

According to research by the National Institute of Child Health and Human Development (NICHD; 2000), reading is the single most important skill a child will learn in life. Reading proficiency is a powerful predictor of academic success, on-time graduation, and future earning

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potential in the workforce. Children who reach adulthood without adequate reading skills are at risk for low self-esteem, unemployment, and poverty (Kutner et al., 2007). For students with disabilities, literacy is crucial to future independence given that nearly every aspect of adult life—from following a bus schedule to filling out a job application to deciphering the instructions on a medication bottle—is dependent upon the ability to read. Extensive research has demonstrated that children with ID learn to read using the same evidence-based strategies employed with other struggling readers (Allor et al., 2010; Bradford et al., 2006; Browder et al., 2013; Burgoyne et al., 2012; Lemons et al., 2012). Yet, many teachers have not been trained to apply what is known about effective reading instruction with children with ID (Ricci & Osipova, 2018) and often resort to limited, functional sight-word programs (Browder et al., 2009).

Elements of Effective Reading Instruction

The National Reading Panel, after reviewing decades of scientific research on how children learn to read, concluded that effective reading instruction must address five essential components: (a) phonemic awareness, the ability to hear and manipulate sounds in words; (b) phonics, the relationship between letters and sounds and the arrangement of these letters within words; (c) vocabulary, the meaning of words necessary to communicate effectively; (d) fluency, the ability to read accurately, fluidly, and with expression; and (e) text comprehension, understanding what is read (NICHD, 2000).

For young children like Molly, who are learning foundational reading skills, experts advise teaching the alphabetic principle—the understanding that words are composed of letters representing speech sounds and that there is predictable relationship between these letters and sounds—using explicit and systematic instruction (Foorman et al., 2016). Explicit instruction is a method of teaching that emphasizes "proceeding in small steps, checking for student understanding, and achieving active and successful participation by all students" (Rosenshine, 1987, p. 34). Archer and Hughes (2011) identified a series of instructional supports or scaffolds that characterize an explicit instructional approach, often referred to as "I do, we do, you do," as shown in *Table 1*.

Systematic instruction involves presenting content in a carefully

sequenced, logical manner, with easier skills taught before more complex ones and fundamental knowledge mastered before higher-level content is tackled (Lane, 2014). To ensure that instruction is delivered in a systematic way, many schools rely on evidence-based commercial programs to teach reading. Lemons and colleagues (2016), who studied literacy outcomes of students with ID, recommended using an evidence-based program as a base when teaching struggling readers. In their work in schools, the authors noted that "too often we find that reading instruction provided to students with ID is disconnected and disorganized. This is often because teachers are not provided with an appropriate instructional program but are instead pulling resources from various sources, including the Internet" (p. 23). Following the scope and sequence of a research-based curriculum is essential to delivering instruction with fidelity.

Learning Profile of Students With ID

Although each student has a unique learning profile, those with ID often share common developmental characteristics that impact achievement of academic skills. Children with ID are at greater risk for vision and hearing impairments (Kiani & Miller, 2010), which contribute to delays in language development. Moreover, receptive language often outpaces expressive language in children with ID (Abbeduto, 2001), which may lead to inaccurate assumptions about a child's academic potential. Delays in fine motor development may mean that extra time and instruction are needed for students to master skills such as cutting, drawing, and handwriting (Shapiro & Batshaw, 2011). Yet, in the area of early literacy development, perhaps the greatest challenges for students with ID arise in the related areas of memory and information processing (Hick et al., 2005; Holmes et al., 2010). Knowledge of how students with ID take in, interpret, store and retrieve information is crucial for teachers when planning literacy assessments and instruction.

Memory impairments are common in children with ID (Vicari et al., 2016). Working memory is often significantly affected, particularly auditory working memory, which involves information delivered verbally (Roording-Ragetlie

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et al., 2018). Working memory has been described as a "mental sticky note we use to keep track of information until we need to use it" (Morin, 2014). It is the ability to hold information in short-term memory while using that information to perform another task. Students rely on working memory to listen to and follow multistep directions or to hold on to a question long enough to formulate an answer. In addition to short-term memory deficits, students with ID may also have weak "explicit" memory, a form of long-term memory that involves consciously recalling previously learned facts or events. In contrast, students with ID often have relatively stronger "implicit" memory abilities, which pertain to tasks performed without thinking, such as riding a bike or signing your name (Vicari et al., 2016) .

Most students with ID have difficulty generalizing concepts learned in controlled environments to other settings or conditions. A child may demonstrate mastery when reading individual words on index cards but not recognize the same words when they appear in connected text. Similarly, a student may read single-syllable words automatically but be unable to decode a compound word made up of two known syllables. These examples illustrate the importance of providing students with ID with ample opportunities to practice newly learned skills in a variety of contexts, with varied materials, and in real-life situations to ensure that they can apply the skills they have learned in a meaningful way.

Inferential learning is challenging for students with ID, who, like most struggling readers, require each skill and concept to be taught directly and explicitly. It is also important to teach phonetic concepts, such as sound–symbol relationships and syllabication rules, to mastery. This ensures that students are not repeating errors that will then have to be unlearned and retaught correctly. Moreover, when the word identification process is automatic, it minimizes the demand on working memory, allowing students to focus almost entirely on text comprehension. Common learning characteristics of students with ID are summarized in *Table 2*.

Adapting Structured Literacy Programs to Meet the Needs of Learners With ID

Reduce Memory Demands

Scaffolded supports facilitate the learning of new skills by assisting students to successfully complete a task they have not yet mastered (McLeskey, 2014). During the learning process, supports are gradually faded until the student can perform the skill independently and consistently. For students with ID, scaffolds can be particularly helpful in reducing memory demands. *Table 3* illustrates examples of supports designed to reduce memory demands for students with ID.

Table 2 Impact of Learning Profile on Literacy Development

Characteristic	What's involved	Implications for literacy
Strengths		
Strong visual learning	Learning through pictures, graphics, symbols	Remembering whole words or word parts (e.g., affixes), which is easier than learning to decode individual letters/letter combinations
Relative strength in "implicit" memory	Information you remember effortlessly based on previous experience	Remembering the lyrics to a song or the rules to a familiar game
Challenges		
Weak auditory working memory	Holding information in short-term memory while performing other cognitive tasks	Recalling sound–symbol associations for letters while blending the sounds together to form a word
Difficulty with "explicit" memory	Information you must consciously work to remember, such as recalling facts	Recalling unmastered letter names or sounds, locker combinations, dates, computer passwords
Difficulty processing and retaining information presented orally	Learning by listening	Orally blending and segmenting spoken words, comprehending text read orally
Difficulty with skill generalization	Performing skills learned in controlled environments in new settings	Generalizing words read in print to other settings, for example, reading the word "bat" in a story but not recognizing the word on a sign in a sporting goods store
Difficulty with inferential learning	Learning new concepts that are not explicitly taught	Generalizing the sound of letters or letter combinations regardless of where they appear in a word, for instance, correctly decoding the digraph *ch* in the word "chin" but not in the word "inch"

In his readings, Mr. Peet learned that working memory deficits can make it difficult for some students with ID to quickly and efficiently read new words. In order to decode, a student must be able to connect letters or letter combinations (graphemes) with their associated sounds (phonemes) and hold that information in short-term memory while blending the sounds together to form a word. He realized that in order for Molly to become a proficient reader, she would need to master letter–sound correspondences until they were absolutely automatic. He decided to begin Molly's daily reading lesson with a letter–sound drill. He started with just a few phoneme–grapheme correspondences, printing them on individual cards that he held up so Molly could practice quickly saying the sound associated with each grapheme. Once Molly mastered the first set of graphemes, he added new ones.

Increase Explicitness of Instruction

Introduce new concepts directly and clearly rather than require the student to infer new concepts. Lesson formats should ensure that the student fully understands what is being taught, and why and how it is to be learned, so that no concept must be inferred. Visuals are likely to be especially helpful to ensure that the desired information is conveyed.

Present concepts in a logical sequence that conveys the relationship between the material taught and previously learned concepts, progressing from the simple to the more complex. For example, when teaching sound–symbol associations, research has demonstrated that rather than proceeding from *A* to *Z*, it is more efficient to begin with the letters that occur most commonly in words (e.g., *m, s, a, t*) and correspond to sounds that are relatively easy to pronounce. This allows students to begin to form words as soon as they have mastered a few consonants and a short vowel (e.g., "at," "mat," "Sam"). It is also important to separate auditorily or visually similar letters (e.g., *d* and *b, m* and *n*) to avoid confusion (Carnine et al., 1997).

Continually linking decoding (reading) and encoding (spelling) emphasizes the inverse relationship between the two—for

Table 3 **Reducing Memory Demands for Students With ID**

Strategy	Specific example
Visual reminders to illustrate steps in a task, schedules, or class rules	Classroom rules:
Breaking a task into smaller subtasks	"Lookback" strategy for comprehension questions: 1. Divide the passage into paragraphs. 2. Write key information from each paragraph in a column to the right of the passage. 3. Read the lookback question aloud. 4. Circle the question word (e.g., "What does the article say was the most dangerous hurricane of the year?"). 5. Underline the part of the question that tells the reader what to look for (e.g., "What does the article say was the most dangerous hurricane of the year?"). 6. Look at descriptions/key words for each paragraph to find one that contains some or all of the underlined words. 7. Read the entire paragraph to determine if it contains the answer. If it does not, place a line through the paragraph. 8. Repeat the process until you locate the answer. 9. Write out the answer.
Graphic organizers to show relationships between concepts	Frayer model (Frayer, 1969) to teach vocabulary: **Definition:** The part of the plant that grows under the ground. **Characteristics:** • gets water from soil • does not get light • grows down **Word:** Root **Examples:** • carrot • beet • tree roots **Non-examples:** • flowers • fruit • leaves
Color coding to illustrate sentence structure	Color code the nouns in red and the verbs in green: Tim put the box on the table. Max ate all the nuts.
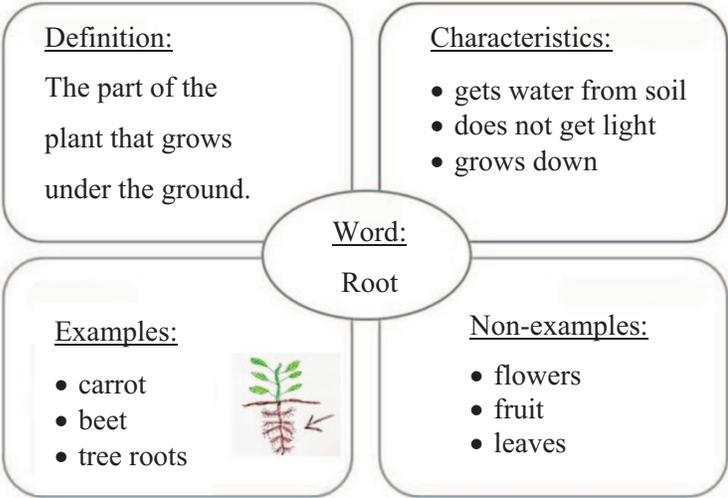
(continued)

Table 3 **(continued)**

Strategy	Specific example
Marking text (e.g., box, underline, highlight) to delineate unmastered letter combinations or syllable division patterns	Underline digraphs/trigraphs: slack, those, hatch, weight Box taught word families: ball ham sunk ring bang pan Mark syllable division: nap|kin mon|ster ta|ble li|on
Mnemonics	"POWER" for writing assignments: Plan, Organize, Write, Edit, Revise
Rhymes, songs, or phrases to aid in retention of concepts	Learning the rhyme "*i* before *e* except after *c*" to remember a spelling rule

Table 4 **Examples of Phonemic Awareness Skills**

Skill	Sample question	Answer
Isolation	What is the first sound in "tar"?	/t/
Deletion	How do you say "great" without the /g/ sound?	rate
Addition	What do you get if you add /s/ to the beginning of "lip"?	slip
Substitution	What do you get if you replace /m/ with /p/ in "man"?	pan
Blending	What do you get if you put these sounds together: /r/…/u/…/g/?	rug
Segmenting	How many sounds (phonemes) are in the word "box"?	4: /b/, /o/, /k/, /s/

instance, presenting new letters or letter combination in both "directions" (symbol to sound and sound to symbol). It is also often beneficial to alternate between reading and spelling activities rather than complete all reading activities prior to spelling, as is recommended within certain commercial reading programs.

When Mr. Peet thought about Molly's current areas of difficulty in reading, he saw many opportunities to employ more explicit instruction. For example, when Molly encountered an unfamiliar word in a text, Mr. Peet had been prompting her to "look at the picture" for clues or to guess at the word based on context, but these strategies had not been successful. He decided to reduce the need for guessing by providing Molly with controlled text that contained only words she could read by sight or decode based on phonetic skills she had already mastered. Mr. Peet also noticed that Molly frequently confused sight words that looked similar, such as "would" and "could," "though" and "thought," and "was" and "saw." He realized that most of these irregular words varied by just one element and decided to teach Molly to utilize her phonetic knowledge to decode those word parts containing sound–letter associations she had already learned (Farrell et al., 2019). For example, Molly could distinguish "would" from "could" by applying her knowledge of initial letter sounds in words and "though" from "thought" by applying her knowledge of final letter sounds.

Add Visual Supports for Skills or Concepts That Rely on Listening

For struggling readers, including children with ID, one of the first signs that there may be a reading problem is difficulty recognizing and manipulating individual sounds in speech (phonemic awareness). Evidence shows that phonemic awareness skills develop along a continuum, progressing from less complex skills, such as isolating initial sounds in words, to the more advanced skill of blending and segmenting individual sounds to form words (Pufpaff, 2009). Examples of phonemic awareness tasks are presented in *Table 4*.

Deficits in phonemic awareness—particularly in the crucial area of sound

Figure 1 **Example of Elkonin boxes**

Figure 2 **Letter stickers for spelling**

1. Teacher orally dictates the sounds in a word while demonstrating the placement of tokens into corresponding boxes. The teacher reads the word, then clearly enunciates the component phonemes while simultaneously placing a token into the corresponding word box on the Elkonin Boxes Practice Sheet (see online appendix). For the word "pat," for instance, the teacher reads the word, then pronounces /p/ while placing a token into the first word box, then /ă/ while placing a token into the second box, and finally /t/ while placing a token into the third word box.

2. Teacher orally dictates the sounds in a word while student places tokens into Elkonin boxes. The teacher reads a word, directing the student to put tokens into successive Elkonin boxes corresponding to each dictated phoneme.

3. Student independently segments the word and places tokens into Elkonin boxes. Using cut-out or magnetic letters, the teacher lines up the letters that compose the target word under each of the appropriate blanks on the Elkonin Boxes Practice Sheet. The student is then directed to sound out each letter sound in the word while sliding that moveable letter token into the corresponding word box. For the word "pat," for example, the student pronounces /p/ and slides the letter *p* into the first word box, then /ă/ and slides the letter *a* into the second word box, and finally, /t/ and slides the letter *t* into the third word box.

4. Student independently uses Elkonin boxes to read word. The student is given a marker and directed to write the letters of the target word in the appropriate Elkonin boxes. The student is then prompted to read the word aloud. To reduce fatigue for students with fine motor deficits, letter tiles or stickers can be used in place of writing, as shown in *Figure 2*.

Visual supports can also be helpful when teaching students to blend sounds into words, a skill that may be particularly challenging for students with ID. One way is to use graphic of a slide, shown in *Figure 3*, to demonstrate blending sounds in the word "mat." The student begins by moving the *m* down the slide while saying the sound "mmmmmmm" until it hits the *a*, then blends the two sounds to make "maaaaa," stretching that sound until it hits the *t* to complete the word.

blending and segmentation—hinder a student's ability to master letter–sound relationships, a skill that is essential to decoding unknown words. Children who struggle to acquire phonemic awareness often need these skills taught in a systematic and explicit manner with ample opportunities for supported practice. One way to visually support sound segmentation and blending is through the use of Elkonin boxes (Keesey et al., 2015). An example of Elkonin

boxes for the word "cup" is illustrated in *Figure 1*.

To use Elkonin boxes, the student listens to a word read by a teacher and moves a token into a box for each sound (phoneme). In some cases, different-colored tokens may be used for consonants and vowels or for each phoneme in the word. To implement Elkonin box instruction with faded scaffolded supports, the teacher follows these steps:

Figure 3 Slide graphic for blending sounds

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Mr. Peet noticed that Molly often confused the sounds for short o *and short* u *in consonant-vowel-consonant words. For example, she spelled "cot" as "cut," "pup" as "pop," and "bun" as "bon." To help Molly distinguish between these vowel sounds, Mr. Peet made picture cards with keywords to represent each sound, using a picture of an octopus for* o *and an arrow pointing up for* u. *Since there were other children in first grade who also struggled with this skill, Mrs. Larkin put a poster in her classroom with keywords and pictures for all the short vowel sounds.*

Use Embedded Instruction to Help Students Generalize Skills

A significant challenge for most children with ID is generalizing skills learned in controlled environments to everyday use. One evidence-based strategy to promote generalization is embedded instruction (Riesen et al., 2003), a practice that distributes learning opportunities within and across typical class activities. Embedded instruction allows students to learn and practice skills within the context of the ongoing routines of a typical lesson or classroom (Snyder et al., 2015).

Embedded instruction facilitates learning and retention of skills in several ways. Having repeated opportunities to practice a skill in the context of typically occurring activities increases the likelihood that the skill will be generalized. Embedded instruction can occur without interrupting the instruction of other students in the classroom. In addition, proven methods of instruction for students with ID (e.g., explicit instruction, constant time delay, prompt hierarchies) are fully compatible with embedded instruction.

Mr. Peet noticed that Molly was having trouble distinguishing between the sounds associated with the digraphs ch *and* sh, *for example, reading "chip" as "ship." To increase her opportunities to practice these digraphs, Mr. Peet spoke to the other members of Molly's team about ways to reinforce the skill in different settings with a variety of materials. The group decided that throughout the day, adults supporting Molly would point out pictures or objects representing words that contained* ch *or* sh *and have Molly identify the correct digraph. They also added gestural cues—touching the chin for* ch *and placing a finger over the lips for* sh—*to reinforce the difference between the sounds. Within just a few weeks, Molly was no longer confusing the two digraphs.*

Use Varied Strategies to Motivate Students and Keep Lessons on Track

Most students with ID require intensive instruction and repeated practice to reach their literacy goals. In fact, students with ID may take up to 4 times longer to master a skill when compared with typically developing learners (Allor et al., 2014). One way to increase student engagement is to offer choices regarding materials used (e.g., letter tiles vs. cards, dry-erase marker and board vs. paper, ink color, text topic) and activity sequence (e.g., spelling before reading). In addition, technology can serve as an instructional tool, particularly iPads, which tend to be especially engaging for many students. A wide array of applications exists that can be incorporated into evidence-based instruction without impeding the fidelity of the delivery, such as electronic white boards and virtual letter tiles. These tools are also invaluable during periods of distance learning. Many students respond especially well to multisensory experiences, such as games and movement—for instance, tossing a ball to recall sound–symbol correspondences or practice alphabet sequencing, or presenting words within word-find or concentration games. Finally, many students are highly motivated when included in progress-monitoring efforts, which highlight incremental gains that would otherwise go unnoticed.

Once Mrs. Larkin and Mr. Peet had reviewed the research on reading instruction for students with ID, they called a team meeting to share what they had learned and to design an updated reading program for Molly. All were in agreement that Molly would benefit from intervention that incorporated both phonics and sight-word instruction. They selected a phonics-based program already in use in the district for students with learning disabilities based on studies showing the effectiveness of similar programs with students with ID. Mr. Peet shared his ideas for tailoring the

intervention to accommodate Molly's learning profile, including strategies for reducing memory demands as well as techniques to increase engagement and motivation. The team agreed to meet in 3 months to review Molly's progress and revise the program as needed.

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