Effective Literacy Instruction for Students with Disabilities

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Background

Before the Education of All Handicapped Children Act (EAHCA) was enacted in 1975, millions of children and adolescents with disabilities were receiving inappropriate education or were completely excluded from public schools. Legislators passed EAHCA to end discriminatory practices and to ensure students with disabilities were afforded public education. Central to the EAHCA was the principle of free and appropriate public education (FAPE) for students with disabilities. This act was later renamed the Individuals with Disabilities Education Act (IDEA) in 2004.

Appropriate education has been defined in case law as instruction that enables students to benefit academically. Specifically, courts have ruled that appropriate instruction for students with disabilities is individualized instruction that permits students to achieve educational goals. To meet the instructional needs of students with disabilities, individualized education programs (IEPs) are crafted for each qualifying student.

Although all students with disabilities are unique and students’ IEPs address their specific instructional needs, most students with mild to moderate disabilities experience significant difficulty learning to read. In fact, more than 60 percent of students with specific learning disabilities struggle learning to read (Strickland, Boon, & Spencer, 2013). Consequently, reading achievement among students with disabilities is significantly lower than that of students who do not have disabilities (Figure 1). Without appropriate intervention, students with disabilities will have difficulty not only in school but in life; learning to read is critical for school success and for a child’s well-being (Lyon, 1998).

Researchers have identified facets of reading programs that are effective for improving reading achievement among students with disabilities. This paper illustrates how the instructional design of Imagine Language & Literacy aligns with research-based recommendations for effective reading instruction. Research has demonstrated that computer assisted instruction (CAI) is a medium in which children with disabilities improve reading skills (Hall, Hughes, & Filbert, 2000; Jitendra, Burgess, & Gajria, 2011). Imagine Language & Literacy can be used as a supplemental reading instruction tool in special education to help students acquire necessary skills for learning to read.
Reading Difficulty among Students with Disabilities

Generally, children who struggle to learn to read (a) have poorly developed phonemic awareness and encounter difficulty learning phonics and decoding words, (b) exhibit problems comprehending written material due to language processing deficits, and (c) have both decoding and comprehension difficulties (Martin, Martin, & Carvalho, 2008; Strickland et al., 2013; Swanson & Vaughn, 2010).

Students with Disabilities and Effective Reading Instruction

Considering the challenges students with disabilities encounter as they learn to read, effective instruction must address reading skill deficits if students are to become proficient readers. Torgesen et al. (2001) and Linan-Thompson and Hickman-Davis (2002) report that reading interventions should include the following elements to improve reading skills among students with disabilities:

- Explicit instruction
- Systematic progression through the essential reading skills (i.e., phonemic awareness, phonics, fluency, vocabulary, and comprehension (Ritchey, 2011)
- Mastery orientation
- Intense, one-to-one individualized instruction

Additionally, progress monitoring is critical to ensuring students are acquiring necessary reading skills.

Effective Reading Instruction and Imagine Language & Literacy

The following sections describe how Imagine Language & Literacy aligns with research recommendations for effective reading instruction for students with disabilities.

Explicit Instruction

Explicit reading instruction is effective for improving students with disabilities’ reading performance (Archer & Hughes, 2011; Wanzek, Wexler, Vaughn, & Ciullo, 2010; Reed, 2013; Ritchey, 2011). Explicit instruction includes teacher demonstration of skills, guided practice with high rates of student response, teacher feedback, and distributed and cumulative practice (Archer & Hughes, 2011).

Demonstration of Skills

Direct explanations of concepts and skill modeling are central to explicit instruction. When teachers provide explicit instruction, they directly tell students new information and model how to use skills or apply knowledge.

When new concepts or skills are introduced in Imagine Language & Literacy activities, skills are demonstrated and students are shown or told what to do. For example, when young children are learning letter names and sounds, a letter is shown on the screen and the narrator says the name of the letter and the letter’s sound (Table 1).

<table>
<thead>
<tr>
<th>Table 1: Letter Shapes &amp; Sounds</th>
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</thead>
<tbody>
<tr>
<td>Narration</td>
</tr>
<tr>
<td>“Capital E, /e/”</td>
</tr>
</tbody>
</table>
Similarly, when complex skills are introduced, new skills are described and demonstrated. In the following comprehension activity, the narrator explicitly states the steps for identifying the main idea and then demonstrates how to determine the main idea of a short passage (Table 2).

<table>
<thead>
<tr>
<th>Table 2: What’s the Point</th>
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<tbody>
<tr>
<td><strong>Narration</strong></td>
</tr>
<tr>
<td>“To find the main idea, ask two questions. First, what is the author’s topic? If you can figure out what the author is talking about, you’ve figured out the topic. Second, what is the author saying the most about the topic? That’s the main idea.”</td>
</tr>
</tbody>
</table>

**Guided Practice and Student Engagement**

Practice is essential for learning. In explicit lessons, practice is under the direction of a teacher and is called guided practice. As students learn, teachers provide support and direction to ensure students correctly apply what they have learned. Students with disabilities particularly need guidance as they practice applying new knowledge. Most students with disabilities exhibit attention deficits and they often make careless errors (Mastropieri & Scruggs, 2010). They need teacher guidance to help them focus on the details of academic work and to reduce errors.

Imagine Language & Literacy’s instructional activities provide prompts to guide practice and elicit student participation. In all activities, students learn by answering questions, spelling or saying words, reading text, and applying knowledge. For example, in the following rhyming activity, students are shown a picture and directed to identify the word that rhymes with the target picture. To provide support for practice, the narrator reads word choices when students click the pictures. This enables them to hear the words before choosing a rhyme and reduces the possibility they will select an answer without thinking about what the word sounds like (Table 3).

<table>
<thead>
<tr>
<th>Table 3: Identify Rhyming Words</th>
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<tbody>
<tr>
<td><strong>Narration</strong></td>
</tr>
<tr>
<td>The target word is seal. The narrator reads “bell,” “deer,” and “wheel” when students click on the pictures.</td>
</tr>
</tbody>
</table>

**Feedback and Correction**

One of the most powerful instructional methods is providing feedback on student performance. Immediate feedback about the accuracy of performance is important to ensure students experience successful learning and to reduce the likelihood that students practice errors (Archer & Hughes, 2011; Siewert, 2011; Bursuck & Damer, 2007). Performance feedback should occur immediately following students’ responses. For correct responses, feedback should be concise (e.g., “good,” “correct,” “way to go”). When student responses are incorrect, they should be retaught or shown how to provide a correct response (Archer & Hughes, 2011; Bursuck & Damer, 2007). Feedback is particularly critical for students with disabilities, who are more at risk than other
students for fluency difficulties. Providing corrective feedback allows teachers to reteach essential skills and helps students with disabilities learn to identify reading errors (Watson, Fore, & Boon, 2009).

With Imagine Language & Literacy, if students make errors completing reading activities, they are alerted to their mistakes and are provided with explanations as to why the selected responses are incorrect. This feedback is both instructive and corrective. For example, in the following practice activity for grammar development, students are asked to correctly identify question words when used in a sentence. Instructive and corrective feedback is offered with incorrect responses and positive feedback is issued with each correct response (Table 4).

<table>
<thead>
<tr>
<th>Table 4: History Hero</th>
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<tbody>
<tr>
<td><strong>Narration</strong></td>
</tr>
<tr>
<td><strong>Activity Description</strong></td>
</tr>
<tr>
<td>If a student chooses the incorrect response, a tone is sounded indicating the question was not answered correctly. After multiple incorrect responses, the student is reminded of their goal and provided encouragement to try again.</td>
</tr>
</tbody>
</table>

**Distributed and Cumulative Practice**

Distributed practice is practice distributed across time, and cumulative practice integrates previously learned information with new learning. Both solidify learning. Focused practice facilitates storage of information in long-term memory and also enhances automatic retrieval (Cepeda, Coburn, Rohrer, Wixted, Mozer, & Pashler, 2009). Many students with disabilities have deficits in short-term and/or long-term memory (Mastropieri & Scruggs, 2010). They need extensive practice—distributed, cumulative, and focused—to remember and retrieve information (Archer & Hughes, 2011).

Imagine Language & Literacy provides practice for initial learning and includes cumulative practice of reading skills. For example, when developing word recognition skills, lessons are structured to include practice with previously learned information. For example, lesson 6 of the beginning reading lessons includes a review of lessons 1–5, lesson 12 includes a review of skills covered in lessons 1–11, and lesson 18 reviews content of lessons 1–17.

**Progression through Essential Reading Skills**

To learn to read, students with disabilities must acquire phonemic awareness, phonics, fluency, vocabulary, and comprehension skills (National Reading Panel [NRP], 2001). These skills are interrelated and students must become proficient in all five areas.

**Phonemic Awareness**

Phonemic awareness is the ability to perceive the sound units of words. There is a strong correlation between reading success and phonemic awareness ability (Jamaludin, Alias, & Johari, 2014). Students with disabilities often have phonemic awareness deficits and need explicit instruction to develop an awareness of sounds within words and to learn how to work with and manipulate sounds (Torgesen et al., 2001; de Groot, van den Bos, van der Meulen, & Minnaert, 2015; de Groot, van den Bos, Minnaert, & van der Meulen, 2014).
Imagine Language & Literacy’s phonemic awareness skills are sequenced to teach students about sounds in words. For example, students are first introduced to rhyme. After students learn to identify rhymes, they learn to match initial sounds in words, then to blend onsets and rimes, then to segment words into phonemes to determine whether or not a phoneme comes at the beginning, middle, or end of a word. Additionally, in activities such as Syllable Fun, students count syllables and practice segmenting words by syllables to help them acquire skills necessary for decoding multi-syllable words.

**Phonics**

Related to phonemic awareness is phonics—the ability to understand that specific sounds are represented by a letter or letters. Phonics skills are critical for reading success because an understanding of phonics enables students to develop a reliable system for decoding new words (NRP, 2001). To teach phonics to students with disabilities, instruction should be systematic and explicit (Bursuck & Damer, 2007). With systematic instruction, students are directly taught letter/sound relationships in a defined sequence with frequently encountered sounds/letters taught before less frequently encountered sounds/letters.

Imagine Language & Literacy’s phonics instruction is sequenced to build phonics knowledge. First, students learn letter names of uppercase and lowercase letters. Then, frequently encountered sounds, such as /a/, /m/, and /s/, are introduced before less frequently encountered sounds, such as /v/, /w/, and /z/. As students learn new sounds, they apply phonics knowledge by reading decodable books that correspond to each lesson. More complex elements, such as long vowel sounds, are introduced after students master beginning skills.

**Fluency and Automatic Word Recognition**

The ability to accurately decode words is essential for fluent reading, and fluency is vital for reading success. Fluency is defined as the ability to read accurately, quickly, and with expression (NRP, 2001; Ring et al., 2012). Students with disabilities often struggle with fluency (Swanson & Vaughn, 2010) and need cumulative review of phonics and sight words to improve decoding ability (Allor & Chard, 2011). These students also often require more instruction and added practice opportunities in order to solidify learning. Effective strategies for building fluency among students with disabilities include explicit models of fluent reading and multiple opportunities to repeatedly read familiar text (Denton & Otaiba, 2011; Richards-Tutor, Baker, Gersten, Baker, & Smith, 2015).

Fluency activities provide opportunities for students with disabilities to echo read. Students record and listen to their own reading and then compare their recording with a model. After comparing their reading with the model, students can accept or re-record what they have read to better match the model’s fluency (Table 5).

### Table 5: Read and Record: Beginning Books

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<tr>
<th>Narration</th>
<th>Activity Description</th>
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<tr>
<td>Students click on the microphone to record themselves reading. The model then reads the same sentence and students can click on the green arrow to go to the next page or they can re-record to improve their reading.</td>
<td>Students build fluency and practice decoding by echoing a model and recording each page of a decodable book. Students can compare their speech to that of the model. Teachers can evaluate students’ recordings at any time.</td>
</tr>
</tbody>
</table>
Vocabulary

Vocabulary skills directly influence comprehension as knowledge of word meaning, and usage is critical for understanding text. Students with disabilities often have limited vocabulary knowledge (Leko, Brownell, & Lauterbach, 2010). They learn vocabulary best when they are shown graphic depictions of meaning and taught mnemonic devices for remembering new words (Bryant, Goodwin, Bryant, & Higgins, 2003; Pullen, Tuckwiller, Ashworth, Lovelace, & Cash, 2011; Vaughn & Swanson, 2015).

Imagine Language & Literacy provides vocabulary instruction prior to reading so students will understand all facets of instruction. After a new vocabulary word is introduced and defined, students are asked to choose the best sentence for the word and identify examples and non-examples, checking understanding. Students also have access to glossary definitions during reading (Table 6).

<table>
<thead>
<tr>
<th>Table 6: Word-A-Tron</th>
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<tbody>
<tr>
<td><strong>Narration</strong></td>
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<tr>
<td>“Here’s a word that you will see in the next story. Say, ‘observe.’ Click here to listen to a definition. Which of these things would you do if you wanted to observe something? Drag the word into the correct sentence.”</td>
</tr>
</tbody>
</table>

Unique to Imagine Language & Literacy is an additional emphasis on the acquisition of academic and content area vocabulary. Academic vocabulary instruction addresses general words students need to know to understand academic discourse such as “influence” or “process.”

For content area instruction, reading is not limited to one realm of educational instruction. Indeed, in order to succeed in other subject areas such as science or mathematics, reading comprehension is heavily relied upon. Further, unique vocabularies are encountered when transitioning from one subject area to another (Kaldenberg, Watt, & Therrien, 2015). Beyond just basic vocabulary, Imagine Language & Literacy includes activities that provide students with the opportunity to learn, practice, and become proficient with words used in other academic disciplines, such as science and mathematics. In these activities, words are presented in the context (e.g., “average” is taught and basic use is demonstrated) (Table 7).

<table>
<thead>
<tr>
<th>Table 7: Name That Word</th>
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<tbody>
<tr>
<td><strong>Narration</strong></td>
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<tr>
<td>“Which of these words is the mystery word? Try to get it right in one clue.”</td>
</tr>
<tr>
<td>“For 100 points here is your first clue: When the line on the (ding) goes up, it means you read more books.”</td>
</tr>
<tr>
<td>“Choose the mystery word!”</td>
</tr>
</tbody>
</table>
Comprehension

Comprehension or understanding text is the culmination of the reading process. Students who have vocabulary knowledge and who read fluently devote cognitive resources to comprehending written material (Brabham & Villaume, 2002; Penno, Wilkinson, & Moore, 2002). Comprehension occurs when all aspects of reading processes are efficiently integrated. Students with disabilities often experience difficulty comprehending written material due to basic reading skill deficits and language processing problems (Chard, Ketterlin-Geller, Baker, Doabler, & Apichatabutra, 2009). Explicitly teaching students with disabilities vocabulary and strategies for comprehending text improves their comprehension (Hall, 2004; Jitendra, Burgess, & Gajria, 2011).

Imagine Language & Literacy’s comprehension activities provide explicit instruction on a range of comprehension skills including identifying main ideas; answering literal and inferential questions; creating story maps to identify character, setting, plot, problem, and solution; and evidence and reason. For all comprehension activities, strategies are explicitly taught and modeled, and students are guided through practice activities that enable them to apply learning (Table 8).

<table>
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<tr>
<th>Table 8: Map It Out</th>
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<tbody>
<tr>
<td><strong>Narration</strong></td>
</tr>
<tr>
<td>To teach students how to use graphic organizers to create story maps, elements of stories are listed on this organizer. When students click on a box, the narrator explains the story element. For plot, the narrator states, “This is the box for the plot: all of the events that happen as the characters try to solve the problem.”</td>
</tr>
</tbody>
</table>

To further aid in the development of good comprehension skills, Imagine Language & Literacy, as a digital learning tool, also benefits from instructional features optimized by digital mediums. This includes textual enhancement, graphic organizers, story maps, and other features that help develop comprehension (Ozmen, 2011; Winke, 2013).

Mastery Orientation

Mastery learning stems from Bloom’s (1971) work on instructional factors that influence student learning. To implement mastery learning, teachers determine instructional units and learning goals and assess student performance using formative assessments. The purpose for using formative assessments is to help teachers identify what students have learned and to target instruction students might need to improve learning (Guskey, 2010). For students with disabilities, instruction that is mastery oriented has been shown to positively affect reading achievement (Linan-Thompson & Hickman-Davis, 2002; Torgesen et al., 2001; Mantell, 2013; Smail & MacDonald, 2015).

Imagine Language & Literacy software is designed to respond to student performance data. Learning goals guide instruction in critical skill areas such as letter and word recognition. As students complete learning activities and assessments, the computer responds to student performance. For example, if assessment data indicates that students have not mastered targeted skills, they are routed to remedial activities. Remedial activities provide reteaching of essential skills and additional practice.
Intense, One-to-One Individualized Instruction

Intense instruction exceeds what is provided for the majority of students in general education classes. Instruction can be intensified by increasing instructional time for reading, providing more opportunities for students and teacher interactions (i.e., with small-group or one-to-one instruction), and increasing student engagement (Ritchey, 2011).

Evidence-based instruction for students with disabilities should be intense and individualized (Zumeta, 2015), meaning students with disabilities should receive more, highly intense, highly engaging instruction designed to address students’ needs. Individualized instruction should be provided in one-to-one settings or small groups of students.

Imagine Language & Literacy is suitable for intensifying and individualizing instruction for students with disabilities. When students with disabilities use Imagine Language & Literacy in addition to receiving classroom instruction, instructional time for reading is increased. The computer-assisted instruction is designed for individualized, one-to-one learning. The adaptive nature of the program allows for students to be placed in the program according to individual needs, and progression in the program depends on student performance.

Additionally, as all activities require student response and application of learning, students are constantly engaged. After studying a new word, students play two games—an automaticity game designed to build word recognition speed, and another that measures their recognition accuracy (an assessment) prior to reading a decodable story that includes the new word (Table 9).

| Table 9: Blaster and Word Survivor |
|-----------------------------------|----------------------------------|
| **Narration**                     | **Activity Description**         |
| “Let’s quickly review the sight    | Students practice identifying    |
| words you need to know.” Students  | sight words. This is a timed      |
| are then given a review of the new | game with the goal of identifying |
| words before the game begins.     | the correct word as quickly as    |
|                                  | possible.                        |
| “Click the hat that says the right | Students demonstrate their        |
| word.” As the student moves his   | decoding knowledge as they        |
| or her mouse over the hats, they  | identify words correctly.         |
| will hear different words.        |                                  |

Progress Monitoring

Progress monitoring is an approach for individualizing instructional decisions with respect to students’ skill development. In schools, progress monitoring is conducted at least monthly and is designed to estimate rates of improvement and to identify students who require additional instruction. It is also used for making individualized instructional decisions (Fuchs & Fuchs, 2011). Tracking student progress is not only critical for ensuring that instruction is effective, but IDEA requires that students’ progress be tracked and reported. Progress monitoring is an integral part of instruction (Santi & Vaughn, 2007; Vaughn & Swanson, 2015), and students’ IEPs specify how progress toward the achievement of stated goals will be monitored and reported (Individuals with Disabilities Education Act [IDEA], 2004). Ideally, progress should be monitored on a regular basis in special education and should inform instructional decisions.

Imagine Language & Literacy provides teachers with reports on student progress and learning. The Action Areas Tool reports student data in a user-friendly, easy-to-implement format for teachers. The tool lists students individually and by skill area. The
skill area list is provided for teachers to easily plan small groups around instruction on a particular skill. The individual list allows teachers to see an individual student’s struggles and needs (Figure 2). Every skill area also includes intervention tools and resources for the teacher to use in his or her targeted instruction (Figure 3).
In the Progress Tool, teachers can generate an overview summary of the progress of all students in a group or they can review individualized reports by student. Group overviews describe students’ performance in specific curriculum areas and flag students who require intervention (Figure 4). Individual report summaries provide teachers with information about student progress in the Imagine Language & Literacy program and performance on skill assessments (Figure 5). Most curriculum areas can be broken down even further so teachers can see a detailed view of a student’s work in a particular area. The Progress Tool links directly to the Action Areas Tool.

Figure 4: Progress Tool – Class Overview

Figure 5: Progress Tool – Individual Summary
Conclusion

IDEA mandates that students with disabilities receive appropriate public education enables students to benefit from instruction and make progress. If students with disabilities do not become proficient readers, they are unlikely to make significant academic progress because reading skills are integrated in all aspects of school work. Currently, reading achievement among students with disabilities is not on par with their peers who do not have disabilities.

Imagine Language & Literacy is a practical and effective solution for students with disabilities who are learning to read.

Works Cited


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