Benchmark Phonics Intervention Research Foundation

Introduction

Benchmark Education Company designed and built a Tier 3 phonics intervention program to meet the need of providing systematic, explicit phonics instruction to students who are two or more years below level, students with dyslexia, and students with other learning disabilities. The *Benchmark Phonics Intervention* program offers four levels of instruction based upon a Kindergarten through Grade 3 reading scope and sequence. This research foundation provides a description of the research upon which this program was built.

Kilpatrick (2015) suggests when a parent or teacher says a student struggles with reading comprehension, the first question should be, if the text or passage were read to the student, would she understand it? If the answer is yes, and the student's oral reading is not smooth and effortless, there is probably a problem with weak word-level reading skills. These are just the first questions that might be posed to narrow the focus of the type of intervention that would work best for a struggling student. Being able to identify if reading difficulties are due to a word-level reading skills is important. Addressing language comprehension or attention issues, for instance, points to very different types of interventions. This research foundation on *Benchmark Phonics Intervention* will focus on students with weak word-level reading skills. Comprehension difficulties not attributable to word-level reading problems will not be dealt with in this research foundation.

Topics within the research foundation start with the recommendations from the Institute of Education Sciences for struggling readers, both for primary grades and for adolescents. This is followed by background on students who respond inadequately to instruction, early reading interventions, and Tier 3 interventions in Grade 4 and beyond. The next set of topics provides more targeted information about instructional components of *Benchmark Phonics Intervention*, including the phonemic proficiency intervention continuum, letter-sound knowledge and phonemic manipulation, orthographic mapping, cumulative practice, building fluency, and increasing background or content knowledge and vocabulary.

Recommendations for Struggling Readers from the Institute of Education Sciences

Even though Response to Intervention (RtI) and Multi-Tiered System of Support (MTSS) have been used in schools and districts for some time, it is a good idea to review definitions. RtI will be referred to in this document. The practice guide from the Institute of Education Sciences (IES) titled *Assisting Students Struggling with Reading: Response to Intervention and Multi-Tier Intervention for Reading in the Primary Grades* (Gersten et al., 2009) defines RtI as "a comprehensive early detection and prevention strategy that identifies struggling students and assists them before they fall behind" (p. 4). Additionally, the RtI systems "combine universal screening and high-quality instruction for all students with interventions targeted at struggling students" (p. 4). With RtI, there are three levels called Tiers. With MTSS, there could be more than three levels.

Tier 1 instruction includes the reading instruction provided to all students in the class. Tier 2 instruction, called interventions, is provided to students "who demonstrate problems based on screening measures or weak progress from regular classroom instruction" (Gersten et al., 2009, p. 4). Students in this tier

receive supplemental small-group reading instruction designed to build foundational reading skills. Tier 3 interventions are provided for those students who do not make progress after a reasonable amount of time with the Tier 2 instruction. Tier 3 instruction can be one-on-one tutoring or small-group instruction with a mix of instructional interventions. "Systematically collected data are used to identify successes and failures in instruction for individual students. If students still experience difficulty after receiving intensive services, they are evaluated for possible special education services" (Gersten et al., 2009, p. 4).

The IES practice guide (Gersten et al., 2009) also provides five recommendations related to helping struggling readers. These recommendations, along with the sub-recommendations, are presented by tier and can be found in Table 1. Column 1 of Table 1 shows the tier to which the recommendation applies. This is followed by the recommendation, the level of evidence, and how to carry out the recommendation. The levels of evidence are based on the type of evidence available.

- Strong evidence "requires both studies with high internal validity … and studies with high external validity" (p. 3). Studies are considered to have high internal validity when designs can support causal conclusions. When studies include a range of participants and settings and results can be generalized to those participants and settings, the studies are considered to have external validity.
- Moderate evidence "is derived from studies that support strong causal conclusions, but where generalization is uncertain, or studies that support the generality of a relationship, but where the causality is uncertain" (p. 3).
- Low evidence "is based on expert opinion derived from strong findings or theories in related areas or expert opinion buttressed by direct evidence that does not rise to the moderate or strong levels" (p. 3).

Table 1. Recommendations, Level of Evidence, and How to Carry Out the Recommendations for Students in Primary Grades

Tier	Recommendation	Level of Evidence	How to Carry Out This Recommendation
	1. Screen all students for potential reading problems at the beginning of the year and again in the middle of the year. Regularly monitor the progress of students who are at elevated risk for developing reading disabilities.	Moderate	Create a building-level team to facilitate the implementation of universal screening and progress monitoring.
			Select a set of efficient screening measures that identify children at risk for poor reading outcomes with reasonable degrees of accuracy.
			Use benchmarks or growth rates (or a combination of the two) to identify children at low, moderate, or high risk for developing reading difficulties.
Tier 1	2. Provide differentiated reading instruction for all students based on assessments of students' current reading levels.	Low	Provide training for teachers on how to collect and interpret student data on reading efficiently and reliably.
			Develop data-driven decision rules for providing differentiated instruction to students at varied reading proficiency levels for part of the day.
			Differentiate instruction—including varying time, content, and degree of support and scaffolding—based on students' assessed skills.

Tier	Recommendation	Level of Evidence	How to Carry Out This Recommendation
Tier 2	3. Provide intensive, systematic instruction on up to three foundational reading skills in small groups to students who score below the benchmark score on universal screening. Typically, these groups meet between three and five times a week for 20 to 40 minutes.	Strong	Use a curriculum that addresses the components of reading instruction (comprehension, fluency, phonemic awareness, phonics, and vocabulary) and relates to students' needs and developmental levels.
			Implement this program three to five times a week, for approximately 20 to 40 minutes.
			Build skills gradually and provide a high level of teacher-student interaction with opportunities for practice and feedback.
Tier 2	4. Monitor the progress of tier 2 students at least once a month. Use these data to determine whether students still require intervention. For those students still making insufficient progress, school-wide teams should design a tier 3 intervention plan.	Low	Monitor progress of tier 2 students on a regular basis using grade appropriate measures. Progress monitoring should occur at least eight times during the school year.
			While providing tier 2 instruction, use progress monitoring data to identify students needing additional instruction.
			Consider using progress monitoring data to regroup tier 2 students approximately every six weeks.
Tier 3	5. Provide intensive instruction on a daily basis that promotes the development of the various components of reading proficiency to students who show minimal progress after reasonable time in tier 2 small group instruction.	Low	Implement concentrated instruction that is focused on a small but targeted set of reading skills.
			Adjust the overall lesson pace.
			Schedule multiple and extended instructional sessions daily.
			Include opportunities for extensive practice and high-quality feedback with one-on-one instruction.
			Plan and individualize tier 3 instruction using input from a school-based RtI team.
			Ensure that tier 3 students master a reading skill or strategy before moving on.

Kamil et al. (2008) also provide a recommendation with strong evidence for struggling adolescent readers in the IES publication *Improving Adolescent Literacy: Effective Classroom and Intervention Practices*. Table 2 contains the recommendation. The first column provides the text of the recommendation. The second column shows the level of evidence associated with the recommendation, and the last column shows how to carry out the recommendation.

Kamil et al. (2008) noted "test score data and research continually confirm that many adolescents first need to improve their reading comprehension skills before they can take full advantage of content-area instruction" (p. 6). This confirmation shows the importance of intervention for struggling readers. According to Kamil et al., struggling readers are defined as "students who probably score well below their peers on state reading tests and whose reading deficits hinder successful performance in their coursework" (p. 7).

Table 2. Recommendations, Level of Evidence, and How to Carry Out the Recommendations for Adolescents

Recommendation	Level of Evidence	How to Carry Out This Recommendation
5. Make available intensive individualized interventions for struggling readers that can be provided by qualified specialists.	Strong	Use reliable screening assessments to identify students with reading difficulties and follow up with formal and informal assessments to pinpoint each student's instructional needs.
		Select an intervention that provides an explicit instructional focus to meet each student's identified learning needs.
		Provide interventions where intensiveness matches student needs: the greater the instructional need, the more intensive the intervention. Assuming a high level of instructional quality, the intensity of interventions is related most directly to the size of instructional groups and amount of instructional time.

Torgesen (2000) indicates about 2 to 6 percent of early readers do not appear to respond to early reading interventions. Fuchs and Fuchs (2015) indicate approximately 20 to 25 percent of students with learning disabilities do not benefit from intervention instruction provided in schools. Young (2017), in an infographic, describes the different groups of readers as follows: for 5 percent of readers, learning to read seems effortless; for 35 percent, learning to read is relatively easy with broad instruction; for 40 to 50 percent, learning to read proficiently requires code-based explicit, systematic, and sequential instruction; and for 10 to 15 percent of readers, learning to read requires code-based explicit/systematic/sequential/diagnostic instruction with many repetitions. This last group is categorized, by Young, as having dyslexia.

Implementation Within Benchmark Phonics Intervention

Benchmark Phonics Intervention uses the Kindergarten through Grade 3 scopes and sequences for phonics skills. Lesson materials have a slightly older look and feel to address the fact that older students will probably be the largest group using the program. Program instruction is designed for an intervention specialist or resource room teacher. Lessons in each unit provide 20 to 30 minutes of intensive instruction that can be added to with Boosters and Additional Supports based on the needs of the students. The instruction in *Benchmark Phonics Intervention* is explicit, systematic, multi-modal, and cumulative, with repetition within and across lessons.

Benchmark Phonics Intervention includes a suite of assessments to assist in placement of students into the materials. Additionally, existing district assessments (e.g., DIBELS Next) can be used to assist in the placement of students. Assessments that come with the program include the Quick Phonics Assessment and the Quick Spelling Assessment, authored by Jan Hasbrouck, Ph.D., as the comprehensive phonics and spelling survey; a program-based weekly cumulative assessment; and foundational skills assessments for phonological awareness, concepts of print, and alphabet recognition.

If, after five of the ten lessons in each unit, students are showing basic proficiency reading and writing words with the targeted phonics skills, the recommendation is to move the students to the next unit of instruction. If students are not able to apply the skills yet, the recommendation is to complete lessons six to ten for additional instruction and practice. Making the informed decision to move on to the next

unit or provide additional instruction and practice enables individualization and intensification of instruction based on student needs.

Background on Students Responding Inadequately to Instruction

Evidence suggests that students who exhibit severe reading difficulties in the primary grades are likely to continue to struggle with reading throughout school (Austin, Vaughn, McClelland, 2017; Foorman, Francis, Shaywitz, Shaywitz, & Fletcher, 1997), and negative consequences for poor reading outcomes have effects that reach far beyond the classroom. Kilpatrick and O'Brien (2019) state "even with reading intervention, weak readers typically remain weak readers" (p. 179), but that does not have to be the outcome.

There is strong evidence that many reading difficulties and disabilities can be prevented in the primary grades with early reading interventions (Fuchs, Compton, Fuchs, Bryant, & Davis, 2008; Partanen & Siegel, 2014; Simmons et al., 2008; Torgesen et al., 2001; Vellutino, Scanlon, Small, & Fanuele, 2006, Wanzek et al., 2018). Research indicates that low levels of initial reading achievement (demonstrated by deficits in phonological awareness, rapid naming, fluency, and the alphabetic principal) predict later low levels of reading achievement (Al Otaiba & Fuchs, 2002; Lam & McMaster, 2014; Nelson, Benner, & Gonzalez, 2003; Vaughn & Linan-Thompson, 2003).

What is the best instruction for students who struggle when learning to read? Austin et al. (2017) suggest considering recommendations from three sources.

- The National Reading Panel (National Reading Panel & National Institute of Child Health and Human Development, 2000) "identified that the best approach to evidence-based reading instruction is one that incorporates each of the five components of reading: phonological awareness, phonics, fluency, vocabulary, and comprehension" (Austin et al., 2017, p. 192).
- The Simple View of Reading (Gough & Tunmer, 1986) "model posits that strong reading comprehension cannot occur unless both decoding skills and language comprehension abilities are strong" (Austin et al., 2017, p.192).
- Finally, the Information Processing Theory (Posner, Lewis, & Conrad, 1972) describes how human cognitive functioning involves imputing, retrieving, processing, and storing information. Based on this theory, "phonological awareness, phonics, fluency, and vocabulary are lower level processes that must be activated and become more automatic to achieve reading comprehension, the highest-level reading process, and the ultimate goal of reading instruction" (Austin et al., 2017, p. 192).

Early Reading Interventions for Struggling Students

Substantial research (e.g., Denton et al., 2013; Gilbert et al., 2013) has documented that early reading interventions do produce significant improvements for most students. The small group of students who respond inadequately to the early reading interventions requires more intensive reading interventions. In an RTI framework, these students will require intensive intervention, also known as Tier 3 within the RtI framework. These students should have already received high-quality Tier 1 or core instruction, and highly standardized interventions, known as Tier 2 instruction. Austin et al. (2017) synthesized the results from 12 studies that documented multi-tiered interventions with the objective of describing the

features of the Tier 3 interventions that produced positive results for students when compared to a comparison group.

Austin et al. (2017) found the size of the group receiving intervention instruction, small-group or one-on-one instruction, did not impact effectiveness; both types of groups produced significant results. Instruction provided by a certified teacher versus research staff did not make a difference in student results. The duration of the intervention, from start to finish, also did not appear to impact the effectiveness.

Four studies (Denton, Fletcher, Anthony, & Francis, 2006; Denton et al., 2013; Gilbert et al., 2013; Scanlon, Vellutino, Small, Fanuele, & Sweeney, 2005), in the Austin et al. (2017) study utilized comparison groups that mirrored the treatment group, meaning the students in the treatment and comparison groups had demonstrated an inadequate response to Tier 2 intervention. The treatment group, in these four studies, received Tier 3 intervention.

In three of the four studies (Denton et al., 2006; Denton et al., 2013; Scanlon et al., 2005), students in the treatment group, receiving Tier 3 interventions, outperformed the students in the comparable control group that received typical school instruction. These studies provided Tier 3 interventions focused on phonics and fluency skills. In Denton et al. (2006) students were in Grades 1 to 3, the group size was one teacher to two students, and instruction included two 8-week sessions of Tier 3 instruction. The first 8-week session involved phonics instruction for two 50-minute sessions separated by a 10-minute break every day for 8 weeks. The second 8-week session focused on fluency for 1 hour each day. Students receiving the Tier 3 intervention preformed significantly better than the students in the control condition on all measures of reading.

In Denton et al. (2013) students were mostly in Grade 2, taught in groups of two or three students during the Tier 3 intervention instruction, and received daily intervention in 45-minute sessions over 24–26 weeks from October through May. Lessons included word study, fluency, reading comprehension, reading connected text, and writing responses to text. “Instructional activities include explicit modeling of skills and strategies with guided practice and independent practice; other activities provide opportunities for extended practice and for application of skills and strategies in reading and writing” (p. 641). “The results of this study indicated that an intensive, individualized supplemental reading intervention can be efficacious for students requiring Tier 3 intervention, particularly in remediating word reading and phonemic decoding difficulties and in supporting comprehension of sentences and brief passages” (Denton et al., 2013, p. 651).

In the Scanlon et al. (2005) study, students in Grade 1 who had received Tier 2 instruction during Kindergarten were assigned to either a control group that received the usual form of remediation or a treatment group. There were two types of treatment: one that had a text-emphasis where more time was spent reading and rereading text, and the other had a phonological-skills emphasis (devoting more time to phonologically based skills). The treatment groups received one-on-one instruction for 30 minutes, 5 times a week, from October to early June. Both Tier 3 interventions produced statistically significant positive results compared to the control group. Additionally, the intervention with the phonological-skills emphasis was more effective in reducing the incident of treatment resistance than the text-emphasis program.

Gilbert et al. (2013), even though this study did not produce positive effects for the Tier 3 implementation, provides instructive information. The students in Grade 1 who were identified as non-responders to the Tier 2 intervention instruction were randomly assigned to more Tier 2 tutoring (comparison condition) or the one-on-one Tier 3 tutoring. The Tier 3 instruction was the same as the Tier 2 except for the delivery format and frequency of instruction. The Tier 2 instruction was in groups of three to four students, for 45 minutes, 3 times a week, for 7 weeks. The Tier 3 instruction was one-on-one for 30 minutes, 5 times a week, for 7 weeks. If we do the math, students who continued with the Tier 2 intervention received a total of 15.75 hours of instruction and students who received the Tier 3 intervention received a total of 17.5 hours of instruction. That is only a 2-hour difference in the amount or dosage of instruction, making these two types of instruction not only similar in the instruction, but also similar in the time spent. This might explain why there was not a statistically significant difference between Tier 2 and Tier 3 instruction.

Wanzek and Vaughn (2007) report on effects of interventions for students with reading difficulties or disabilities in Kindergarten through Grade 3. Wanzek and Vaughn "defined extensive interventions as occurring for 100 sessions or longer, which is the equivalent of 20 weeks of daily intervention" (p. 542). Standardized interventions, rather than individualized interventions, were used in this synthesis of the extant research. Generally, with standardized interventions, the elements of reading instruction "are (a) associated with improved outcomes in previous studies, (b) well defined in a curriculum, and (c) implemented by personnel who are trained specifically in the implementation of the curricula" (p. 542).

Wanzek and Vaughn report positive outcomes for students with reading difficulties and disabilities participating in the 18 studies that used standardized interventions. Studies with the highest effects emphasized both phonics instruction and text reading, some using decodable texts and others that did not. The phonics component was either letter-sound correspondence with word blending or word patterns such as rimes. Several of the studies integrated encoding within the phonics instruction. Increasing the intensity of the instruction using one-on-one instruction or small groups show higher effects. **Starting interventions as early as possible is more effective than waiting until later grades to start interventions.**

McArthur et al. (2015) studied three groups of students with dyslexia, ages 7 to 12. One group received phonics and then sight word training, another received sight word training and then phonics training, and the last group received phonics and sight word training at the same time. Findings include: (1) "training both sight word reading and phonics reading [measured using nonwords] has significant and large training effects on the reading skills of children with dyslexia" (p. 404); (2) outcomes support "the idea that many children with dyslexia need more than just phonics training. They also need to be trained how to read whole words by sight" (p. 405); and (3) "training children to read irregular words will not impair their ability to read via the letter–sound rules" (p. 405). Overall, it seems that training phonics before sight word training had a larger effect on reading untrained irregular words, indicating the phonics training may have helped with interpreting at least some parts of the irregular words.

In sum, students who struggle learning to read in the early grades have better results when the intervention is started as early as possible (Denton et al., 2013; Gilbert et al., 2013; Wanzek & Vaughn, 2007), with a focus on phonics and fluency skills (Austin et al., 2017; McArthur et al., 2015) as well as a

phonological-skill emphasis (Scanlon et al., 2005, McArthur et al., 2015). Small-group instruction is as effective as one-on-one instruction and allows more students to participate (Austin et al., 2017). Students who respond inadequately to Tier 2 instruction require more intensive intervention instruction in Tier 3 (Denton et al., 2013; Gilbert et al., 2013). More of the same type and intensity of instruction will not necessarily be helpful for struggling readers.

Tier 3 Instruction in Grade 4 and Beyond

Wanzek et al. (2013) extend the examination of interventions from Wanzek and Vaughn (2007) beyond Grade 3 to Grades 4 to 12. A total of 19 studies on extensive interventions (with 75 or more sessions) were included in this synthesis. Most of the studies included interventions with three or more components of phonics/word recognition/spelling, fluency, vocabulary, and comprehension. Wanzek et al. (2013) found a small positive effect for extensive interventions on all of these reading components.

Wanzek et al. (2013) concluded that "extensive interventions for students with reading difficulties or disabilities in the upper grades can yield a small effect on a variety of reading outcomes" (p. 187), and this finding "is important as a means of verifying the value of continued reading interventions for students beyond Grade 3" (p. 187). Additionally, Wanzek et al. (2013) found "no evidence that student outcomes differed in relation to the relative number of hours in intervention, whether the intervention was provided in small or large groups, and whether the intervention was provided in upper-elementary or secondary grades" (p. 187).

Wanzek et al. (2013) also looked at just the extensive interventions that had 100 or more sessions from Grades 4 to 12 in this synthesis. They compared those findings to the Wanzek and Vaughn (2007) synthesis of Kindergarten to Grade 3 studies with 100 or more intervention sessions. Two interesting results were found. "Overall, the mean effect sizes from the early elementary synthesis were moderate across reading outcomes, and the effect sizes for the upper grades were small" (Wanzek et al., 2013, p. 188). "The effect sizes from the early intervention studies show a decreasing trend in impact from the shortest to the longest interventions" (Wanzek et al., 2013, p. 188). The same was not true for the upper grades. "There is an increasing trend in effect size for longer interventions in the upper grades" (Wanzek et al., 2013, p. 188). Wanzek et al. (2013) conclude "for secondary students with significant reading difficulties, very intense and sustained interventions may be required to maintain reading growth each year of school" (p. 188).

Vaughn, Roberts, Miciak, Taylor, and Fletcher (2019) generated a researcher-created intervention for students in Grades 4 and 5 who had significant reading problems. The intervention was based on two theories of reading, Chall's (Chall, 1996; Chall & Jacobs, 1983) developmental stages of reading and the Simple View of Reading (SVR; Gough & Tunmer, 1986). Chall emphasized that beginning in Grade 4, students must rely on words and ideas that go beyond students' everyday experiences, meaning there must be a transition to more complex aspects of reading that requires fluency, vocabulary, and high-level thinking with texts. Gough and Tunmer asserted reading is a product of decoding and linguistic comprehension, and a weakness in either could lead to reading comprehension difficulties.

In Vaughn et al. (2019) the intervention took place in three phases. In Phase 1, the instructional focus was word study and reading fluency. For 20 minutes daily, students received instruction that included systematic decoding instruction; practice to achieve automaticity with word patterns and sight words;

work with isolated sound patterns, word parts, word lists, high-frequency sight words, and spelling routines; and fluency activities with text that included target word patterns or sight words. There was a systematic review of taught sound patterns. Phases 2 and 3 focused on text-based reading of stretch text (at least one grade level above the student's reading level) or fluency text with word study. The word study in Phases 2 and 3 included systematic instruction in morphology and automaticity instruction.

Vaughn et al. (2019) conclude "the findings from this study can be interpreted as promising" (p. 39) and the practice with word patterns in multisyllable words and the focus on high-frequency words that students often miss may have positively influenced reading fluency and would be included in future interventions. At the same time, Vaughn et al. (2019) state "there is considerable evidence that students who demonstrate significant reading difficulties, like those participating in this study, will require considerably more intensive and extensive interventions than are typically provided" (p. 39). Suggested methods to intensify interventions include (a) providing interventions for even longer time periods, (b) reducing group size, (c) customizing interventions to meet the individual learning needs of students, (d) considering including reading instruction across the curriculum, and (e) providing supplemental reading time after school or during the summer (Vaughn et al., 2019, p. 39).

Intervention with appropriate intensity that is sustained for longer periods of time increases the impact for struggling students (Wanzek et al., 2013; Vaughn et al., 2019), indicating that intervention beyond the typical stopping point of Grade 3 is important and has value (Wanzek et al., 2013). Practice with word patterns in multisyllable words and high-frequency words positively influences reading fluency (Vaughn et al., 2019). Additionally, for older struggling students, successful interventions include three or more components of phonics/word recognition/spelling, fluency, vocabulary, and comprehension instruction (Wanzek et al., 2013).

The Phonemic Proficiency Intervention Continuum

Kilpatrick (2015) described a synthesis of commonly cited and reviewed intervention studies, focusing on normative score gains. The synthesis showed a pattern in which the magnitude of standard score point gains aligned with the instructional approaches used in the studies. Kilpatrick and O'Brien (2019) report on what they refer to as *The Phonemic Proficiency Intervention Continuum*. The three ranges of standard score point gains categories are Minimal: 0–5.8 standard score point gains; Moderate: 6–9 standard score point gains; and Highly Effective: 10–25 standard score point gains. Below are brief descriptions of intervention elements aligned with these categories of effectiveness.

- Minimal: Interventions in this category "involve visual memorization, reading practice (including repeated readings), and phonics instruction not supplemented with oral-only phonemic awareness training" (p. 195). "For students not skilled in orthographic mapping (i.e., remembering written words), simple exposure and repetition do not improve their ability to retain newly encountered words in any substantial way" (p. 196).
- Moderate: Interventions in this standard score point gains category "involve systematic phonics instruction and basic phonemic awareness instruction (segmentation and blending), combined with reading practice" (p. 198). Most of the studies in this category taught phoneme segmentation. This implies that "simple segmentation training and assessment are not able to

assure that segmentation skills are automatic, which appears to be necessary to become efficient at orthographic learning" (p. 199).

- Highly Effective: In this category, "interventions using more challenging phonemic manipulation activities along with systematic phonics instruction and reading practices" (p. 199) are found. Programs in this category allowed Kilpatrick and O'Brien (2019) to "develop a picture of a more well-established research-based *approach* to addressing reading difficulties" (p. 202) that included these three specific elements.

Letter-Sound Knowledge and Phonemic Manipulation

Letter-sound knowledge and phonemic manipulation are central to the orthographic mapping process, the storing of written words for later immediate recall, necessary for efficient word reading (Miles & Ehri, 2019). While phonemic awareness allows readers to blend and segment the sounds in words, the "letter-sound knowledge enables readers to match graphemes in spellings to their corresponding phonemes in pronunciations of words" (p. 66). The grapheme-phoneme connections provide the glue for sight word storage. Findings from two studies (Boyer & Ehri, 2011; Castiglioni-Spalten & Ehri, 2003) showed the groups that used articulation pictures on the sight word learning task benefitted more than the other groups in learning to read words.

For efficient orthographic mapping, phonemic skills must be automatic and basically unconscious. Kilpatrick and O'Brien (2019) state "when phonemic skills are trained to the level of accuracy, but not automaticity, there may be improvement in phonic decoding skills, but limited improvements in the ability to efficiently add words to the orthographic lexicon (i.e., sight vocabulary)" (p. 203). A deletion or substitution task includes all four conventional phonological awareness tasks (segmentation, isolation, manipulation, and blending) performed as a single task. For example, to delete the /l/ from *slip* or change the /l/ in *fly* to /r/, the following must occur: "One must (1) segment the word, (2) isolate the location of the target sound in that word, (3) delete or substitute the sound, and (4) blend the remaining sounds" (p. 203). If students can respond to these types of items instantly, it is safe to assume a substantial degree of proficiency with phonemic manipulation.

In 1994, Truch presented clinical data for 281 clients with dyslexia who ranged in age from 5 to 55 (Kilpatrick & O'Brien, 2019). The program he used at his clinic included intensive phoneme manipulation activities, letter-sound instruction, and reading practice. The clients gained 17 standard score points on average on the word reading subtest and on the spelling subtest on the Wide Range Achievement Test Revised (WRAT-R). Most interestingly, the gains were equivalent across all age groups. Kilpatrick and O'Brien conclude findings suggest "nearly all individuals of any age (24 clients were between the ages of 18 and 55) can improve their phonemic awareness skills with appropriate training, and a large majority (75% in Truch's study) can develop virtually normal phonemic awareness skills" (p. 200).

Implementation Within Benchmark Phonics Intervention

Benchmark Phonics Intervention includes the review of and instruction on letter-sound knowledge that might be weak or missing from students identified as needing intervention instruction. This knowledge is critical for students to learn. The letter-sound knowledge is taught explicitly, reinforced during the Warm-Up part of the lesson, and practiced through reading and writing activities. Language Transfer Support is available for students who are English Learners.

Challenging phonemic manipulation activities that are age/level appropriate support the phonics skills that are being taught, with cumulative practice representing a significant part of *Benchmark Phonics Intervention*. In Level 1 of *Benchmark Phonics Intervention*, following the Kindergarten scope and sequence, basic phonemic manipulation is taught, including phoneme isolation, segmentation, and blending. Additionally, in Level 1, advanced phonemic manipulation, including phoneme substitution and phoneme addition, is taught. In Level 2, following the Grade 1 scope and sequence, the advanced phonemic manipulation skill of deletion is added to the other skills. In Levels 3 and 4, the additional phonemic awareness skills added to the previously taught phonemic manipulation skills are delete and add sounds and substitute multiple sounds. There are additional lessons in the Phonological Awareness Kit for additional intensive instruction based on student need and results of the Phonological Awareness Assessment. In all levels, the word-building activities combine phonemic manipulation practice and phonics.

Orthographic Mapping

"The process of storing written words for later immediate recall occurs through a process called orthographic mapping. This process involves connecting pronunciations to the written letters that represent those pronunciations in memory" (Miles & Ehri, 2019, p. 63). Orthographic mapping is dependent on letter-sound knowledge and phonemic awareness. Readers must first understand "how letters systematically symbolize sounds and how to distinguish those sounds in pronunciations of the words" (Miles & Ehri, 2019, p. 63). Orthographic mapping occurs both during reading and spelling of words.

Until words are practiced enough to become sight words, meaning the spellings, pronunciations, and meanings of words can be retrieved as soon as the reader sees the word (Ehri, 1992, 1998, 2005; Kilpatrick, 2015), all readers use word-reading strategies. Beginning readers use several strategies when encountering unfamiliar words, including: finding a known sight word with a similar spelling and using that word to read the new word, for instance, using *mountain* to read *fountain*; using prediction by relying on a picture and sentence and letter clues to guess a word; and decoding the unknown word by matching the graphemes to corresponding phonemes and blending the sequence to pronounce the unit, and then finding the word in the mental lexical to determine its meaning (Miles & Ehri, 2019).

"The most effective way to secure new words in memory is through orthographic memory, that is analyzing the grapheme-phoneme or grapho-syllabic units in words" (Miles & Ehri, 2019, p. 73). Below are summaries from several studies that investigated the effect of word-learning experiences on students' ability to store words in memory.

- Ehri and Roberts (1979) found students who read words in context (targeted words in meaningful sentences) learned more about the semantic identities of words than students in the isolation group who read single target words on flashcards and then heard each word spoken in a meaningful sentence. Students in the isolation group could read the words faster and remember their spellings better than the other group who read targeted words in meaningful sentences.
- Ehri and Wilce (1980) extended the Ehri and Roberts (1979) results using a set of function words and similar groups. The sentence-reading group learned more about the syntactic/semantic

identities of the function words. The poorer orthographic learning for this group may be due to the help provided by the context within the sentence, leading to less time spent looking at the word and eyes moving quickly to subsequent words in the sentence. The isolation group learned more about the orthographic identities of the function words. The weaker syntactic/semantic learning for this group may be due to reading the words outside of the sentence context.

- Johnston (2000) used predictable text in three ways. The repeated-reading group read the same text ten times over four days. The sentence-context group reading the text chorally and then read the text on a chart and built the story using sentence strips. The word-bank group underlined words they could read in the text without illustrations. The word-bank group learned the most words based on immediate and delayed word recall tests.
- Wang, Castles, Nickles, and Nation (2011) investigated orthographic learning of regularly and irregularly spelled word. Results show both regularly and irregularly spelled words were read more accurately in context. Over half of the regular spellings were recalled correctly. Only 15% of the irregular spellings were recalled correctly. The authors speculated the poorer performance with the irregularly spelled words was due to these words being harder to learn because of the deviation from expected grapheme-phoneme relations.
- Miles (2015) investigated word-learning experience on native and nonnative English-speaking Kindergarten students. Previous findings were supported by the findings of this study. The findings included learning to read words in isolation was better and learning the words' syntactic and semantic identities in context was better.

Miles and Ehri (2019) summarize the word-learning experiences from these studies as follows. First, "the type or extent of information that is remembered by newly encountered words is influenced by whether the word is read in isolation or context and whether the word is regular or irregularly spelled" (p. 75). Second, "to have a word securely stored in memory as a sight word, it is important for all of its identities to be represented, including its pronunciation, spelling, syntactic function, and meaning" (p. 75). And third, "any instructional program designed for beginning readers should make provisions for all of these identities to become bonded together in memory to support growth in children's sight vocabularies" (p. 75).

Miles and Ehri (2019) indicate "vocabulary learning has been regarded mainly as a process of learning associations between pronunciations and meaning of new words without much regard for the involvement of word spellings" (p. 75). They further suggest that results from recent studies show "exposing learners to the spellings of words whose pronunciations and meanings are being learned boosts their memory for the words" (p. 75) for both younger and older readers. An "oral decoding strategy better supports vocabulary learning. Students who read the words aloud performed significantly better on pronunciation-meaning associations and spelling tasks" (p. 77), and this is especially important for weaker readers. Miles and Ehri conclude "pronouncing embedded words aloud while looking at the spelling of the words supports the formation of connections between spellings, pronunciations, and meanings and this better secures the new vocabulary words in memory" (p. 77).

Implementation Within Benchmark Phonics Intervention

Benchmark Phonics Intervention uses multiple routines for instruction and review of vocabulary and high-frequency words. These routines combine learning in isolation and in context with words that are

spelled regularly and irregularly. The Say, Spell, Read, Write Routine is used to introduce and review high-frequency words and build orthographic mapping through the oral segmentation of words and the attention to known and unknown spellings. The Read, Build, Write Multimodal Routine is used with vocabulary and high-frequency words. The Quick Review Cumulative Routine is used with letter-sounds and high-frequency words where the students chorally respond to cards, the cards are mixed and repeated, and then the practice is extended with a sound or word called out and students find the correct card. Students also create word cards with words on one side and context sentences on the other.

During the Apply to Reading and Writing section of the lesson, students are exposed to words in context using decodable texts and cumulative sentences. With decodable texts, the text is first introduced by the teacher, then vocabulary words are introduced, followed by reading of the text, and finally a check on comprehension. During the Cumulative Sentences Routine, students whisper-read and then chorally read the sentences, the target phonics skill is identified and emphasized (usually circled or underlined), then students write their own sentences with a target word and read them to a partner, and finally, sentence structure of the cumulative sentences is discussed.

The use of these and other routines in the lessons in *Benchmark Phonic Intervention* allows students and teachers to become comfortable with the flow of learning. Students will feel a sense of accomplishment and pride in knowing how to participate and accomplish the routines. The lessons will move smoothly, with little time lost on transitions between activities.

The Power of Cumulative Practice

"The goal of teaching phonics is to develop students' ability to read connected text independently" (Adams, 1990, p. 272). "Reading in context is like 'putting the pedal to the metal' when it comes to phonics. It is when real learning occurs and is confirmed" (Blevins, 2017, p. 78). The question of practice and, more specifically, the amount of practice when it comes to learning phonics and phonological awareness is dependent on the students. For the necessary symbol-sound pairs to be learned well, Adams states, students "must be allowed sufficient practice and opportunity for evaluation" (p. 240) and must be based on the needs of the students being taught.

Reading and writing provide natural and authentic practice opportunities. Blevins (2017) states the type of text that is ideal for practicing a new target skill is decodable text. "This text is controlled based on the phonics skills taught up to that point in the scope and sequence, with an emphasis on the new target skill for that instructional cycle (e.g., week of instruction)" (Blevins, 2017, p. 215). These books provide students with concentrated practice based on the instruction they have received (Moats, 2010). Hatcher, Hulme, and Ellis (1994) indicate phonics instruction is more effective when students are provided with immediate practice opportunities, making the decodable books a valuable tool during the early stages of learning to read.

Dictation is a form of guided spelling practice and provides a way, through modeling and providing supported practice for students, to transfer phonics skills from reading to writing. Additionally, "the great benefit of dictation is that it can accelerate students' use of taught phonics skills in their writing" (Blevins, 2017, p. 91). Shanahan (2016) states "metaphorically, the shared cognitive model

conceptualizes reading and writing as two buckets drawing water from a common well or two buildings built on a common foundation" (p. 195).

Graham et al. (2018), in a meta-analysis, examined the question of students' writing performance improving due to reading interventions for students in Preschool to Grade 12. Findings concluded teaching reading strengthened writing, with an overall effect size of 0.57. A previous meta-analysis (Graham & Hebert, 2010, 2011) showed the reverse was true also: teaching writing and increasing how much students wrote improved students' reading performance.

Implementation Within Benchmark Phonics Intervention

Cumulative practice is at the heart of *Benchmark Phonics Intervention*. Decodable texts that are read during the Apply to Reading and Writing section of lessons are reread to build fluency during the Warm-Up Review and Repetition section of the next lesson. The letters and word cards from previous lessons are reviewed using the Quick Review Cumulative Routine. The Cumulative Sentences contain phonics target skills, vocabulary, and high-frequency skills from current and previous lessons. The cumulative practice includes practice immediately after instruction occurs and practice in later lessons. Practice is multimodal, including writing, dictation, reading, building, and manipulation of letter-sounds and words.

Building Fluency Through Reading and Rereading

Hudson, Lane, and Pullen (2005) state "reading fluency is one of the defining characteristics of good readers, and a lack of fluency is a common characteristic of poor readers" (p. 702). Kilpatrick (2015) states "fluency refers to reading words quickly and accurately, but also with proper intonation or prosody" (p. 121). "Just as songs vary their pitch, so do readers vary their intonation as they read. Such prosody suggests that the reader comprehends the passage *as she reads it*, otherwise she would not likely know when to inflect her voice" (p. 121). Blevins (2017) states "as readers begin to recognize larger and larger numbers of words automatically, their reading fluency (the speed and accuracy with which they read) improves." (p. 154). "The more times a student encounters a word in text, the more likely the student will recognize it by sight and avoid making reading errors. Reading fluency is linked to reading comprehension. Improvements in reading fluency improve understanding of text" (p. 154).

Hudson, Pullen, Lane, and Torgesen (2009) state "reading fluency is a complex, multifaceted construct…it is accurate and efficient, it occurs with reasonable speed that varies with the text, and it involves good comprehension of the meaning of the text" (p. 5). Hudson et al. (2009) summarize that effortless fluency reading is the result of a large number of sub-processes including: automatic access to letter-sound relationships; quick and accurate operation of phonemic analysis and blending processes; automatic access to knowledge of phonograms; a large number of words that can be recognized by sight; quick access to vocabulary knowledge; and efficient operation of basic information processes. Without these sub-processes or with weaknesses in these sub-processes, "reading text will suffer" (p. 18).

Hudson et al. (2009) suggest sub-process areas of importance when examining fluency to determine the most appropriate intervention:

- Sight words: Especially for struggling readers, it is important to be able to recognize relatively common words fluently.

- Phonogram identification: Recognizing the letter groups withing a word that share a pattern across words allows readers to move to more advanced, efficient decoding using chunks instead of phonemes.
- Phonemic decoding: To determine phonemic decoding, or the understanding of the alphabetic principle, it is best to use novel combinations of letters that students are unlikely to have encountered before (i.e., nonwords or nonsense words).
- Letter knowledge: Both letter names (upper- and lowercase) and the corresponding sound for a grapheme should be quickly and accurately identified.
- Phonemic awareness: Linked to later fluency outcomes, the phonemic awareness skills of blending and segmentation should be the focus of examination due to the close link to decoding.

"The most effective [reading] programs include daily exposure to a variety of texts and incentives for children to read independently and with others. Practices that build reading fluency include short practice drills in component skills, repeated readings of text, alternate reading with a partner, simultaneous oral reading of easy material, and daily independent reading" (Moats, 2010, p. 17). Stevens, Walker, and Vaughn (2017) indicate all readers show improvement in reading fluency (reading rate and accuracy) and comprehension with oral repeated reading practice with teacher or peer feedback.

Shanahan (2005) stated "the National Reading Panel examined 51 studies of oral-reading fluency instruction and found a substantial pattern of evidence supporting the idea that teaching oral fluency improves reading achievement" (p. 18). Shanahan (2005) concludes the different types of instruction to increase oral reading fluency that have been studied share three essential features: 1) the instruction must include oral reading rather than silent reading; 2) there must be repetition, allowing students to practice reading texts repeatedly so that improvement occurs in accuracy, speed, and expression; and 3) guidance or feedback is beneficial, making it important to have a listener who can provide help.

Implementation Within Benchmark Phonics Intervention

Fluency is built in *Benchmark Phonics Intervention* with decodable texts, regular and irregular words in isolation and in texts, and letter-sound in isolation and through phonemic manipulation. The Additional Supports suggested with the lessons often support additional fluency opportunities. Teachers are provided with suggestions for appropriate corrective feedback. Working with partners is often recommended, with teacher guidance where necessary. Teachers model aspects of fluency during the reading of decodable texts and cumulative sentences.

Increasing Background or Content Knowledge and Vocabulary

Kaefer (2020) states "background knowledge is essential for reading comprehension and learning from stories" (p. S173). Further, early development, meaning starting with young children, of content knowledge exponentially increases the amount of background knowledge children will develop and is key to academic success for all students (Neuman, Kaefer, & Pinkham, 2014; Pinkham, Kaefer, & Neuman, 2012). Among other things, sufficient background knowledge, allowing students to draw appropriate inferences about a text, is needed to successfully comprehend that text (Kaefer, 2020). In a study of background knowledge, Kaefer found that "students with higher levels of knowledge on a topic,

including the vocabulary specific to that topic, that was activated through prereading activities attended more to the relevant illustrations and made more appropriate inferences than did students who acquired new knowledge from prereading activities" (p. S180). Kaefer also found that "when students did not already have background knowledge related to the topic at hand, they were unlikely to engage in inductive inferencing, even if they successfully learned the information shared in the prereading activities" (p. S180).

Stuart and Stainthorp (2016) indicate reading to students has a long tradition and supports implicit vocabulary learning and is supported by evidence (e.g., Robbins & Ehri, 1994). In the Flack, Field, and Horst (2018) meta-analysis of research on storybook reading, the authors identified what influenced the new word learning during shared storybook reading, including: reading style; use of dialogic techniques such as pointing, providing definitions, or asking students questions during reading; and increasing the number of times students hear words during reading through repeated readings and asking questions about targeted words.

Kaefer (2020) also identified read-alouds as a popular way to convey content knowledge and build literacy skills. To be most effective, they should be interactive (Barnes & Dickinson, 2017) and involve multiple genres (Duke, Halvorsen, & Knight, 2012). Kaefer suggests the usage of diversified books may provide all students a chance to hear books that address knowledge they have already developed. For students that are new to a topic, the simple comprehension that can be achieved by providing knowledge in prereading activities may be the first step toward developing a rich background of information on a topic.

Wasik, Hindman, and Snell (2016) report on book reading practices as they relate to increases in vocabulary. Findings show six strategies that are consistently used in studies. These include: reading and rereading texts; explicitly defining words; encouraging dialogue about book-related vocabulary through questions and discussion; retelling; using props to illustrate word meanings; and encouraging students in post-reading activities that promote the exploration and discussion of vocabulary. A clear theme from the review of the literature showed adult-child interaction during book reading is critical for vocabulary learning to occur. These strategies allowed the deeper exploration of vocabulary opportunities, supporting growth in background knowledge.

If there is not enough background information to enable complex comprehension using read-alouds, different strategies for building background knowledge could be used. Knowledge is best built when it can be processed in depth (Beck & McKeown, 2007; Coyne, McCoach, Loftus, Zipoli, & Kapp, 2009), when it is repeated over time (Pinkham, Neuman, & Lillard, 2011), and when it can be connected to information that students already know (Shing & Brod, 2016). With this information, it may be better to use knowledge-building activities in a subject area in addition to read-aloud activities.

Implementation Within Benchmark Phonics Intervention

Even though *Benchmark Phonics Intervention* is designed for students who have been identified with weak word-level reading skills, requiring attention to phonics needs, attention to background or content knowledge and vocabulary is still a central component to the program. Besides the decodable texts, the Read-Aloud Cards used during the Vocabulary Booster not only provide additional vocabulary, but the story associated with each card provides background or content knowledge that is also connected to the

decodable text students will be reading. There are also checks for comprehension during the text reading and suggestions for deepening comprehension through writing.

Summary

The *Benchmark Phonics Intervention* program was designed and built for struggling students who are two or more years below grade level. The program is designed for one-on-one or small-group instruction delivered by an intervention specialist or resource room teacher. The instruction is explicit, systematic, multimodal, and cumulative. Practice and repetition are purposeful, with an emphasis on application to reading and writing, and by design occurs within and across lessons.

The instructional design and routines encompass the tenents of the Science of Reading and Structured Literacy. This research foundation provided the research upon which the *Benchmark Phonics Intervention* was designed and built. Along with sections describing the research, there are direct connections to the relevant components and activities in *Benchmark Phonics Intervention*, showing the connections between the extant research and the program.

The best solution for students learning to read is to receive strong Tier 1 core instruction. This ensures the success of a majority of students in the early grades. For students who need additional instruction, *Benchmark Phonics Intervention* is a strong, standardized intervention program with intensive instruction that can be further intensified based on student need. As previously stated, intervention with appropriate intensity that is sustained for longer periods of time increase the impact for struggling students (Wanzek et al., 2013; Vaughn et al., 2019), indicating that intervention beyond the typical stopping point of Grade 3 is important and has value (Wanzek et al., 2013).

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