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DIBELS and CBM: Using these Measures to Promote Big Ideas in Beginning Reading in Kindergarten through First-Grade

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DIBELS AND CBM: USING THESE MEASURES TO PROMOTE BIG IDEAS IN BEGINNING READING IN KINDERGARTEN THROUGH FIRST-GRADE

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DIBELS AND CBM: USING THESE IDEAS TO PROMOTE

BIG IDEAS IN BEGINNING READING IN KINDERGARTEN THROUGH FIRST-GRADE

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An overview of phonological awareness, the alphabetic principle, and fluency with text is provided. Focusing on these 3 big ideas, a literacy program at a local school was evaluated. Kindergarteners were administered the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) 3 times a year to indicate their skills related to phonological awareness and the alphabetic principle. Students needing intensive instructional support received 40 to 70 minutes of small group instruction per week. As first-graders, all students read curriculum-based measurement (CBM) reading probes to assess their fluency with text. Of primary concern was the extent to which the different interventions in kindergarten 1) assisted students in attaining the May DIBELS benchmarks and 2) were related to performances on CBM reading probes in first-grade. Results show that early intervention is critical; of the kindergarten students receiving interventions, the students receiving interventions first semester experienced the most favorable outcomes in May. Additional data suggest students in need of interventions later in the year are identifiable in September, and therefore, can be provided with immediate interventions. Finally, performances on DIBELS measures in kindergarten were related to performances on CBM reading probes in

first-grade, suggesting that DIBELS measures reasonably estimate the development of pre-reading skills and later reading ability.

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DIBELS and CBM: Using these Measures to Promote Big Ideas in Beginning Reading in Kindergarten through First-Grade

Reading is a critical skill that has a tremendous impact on students' academic achievement and life outcomes. However, not all students gain the necessary skills that allow them to be successful readers. Research shows that 20% of students experience significant reading problems. Such problems usually surface by the time students are in third-grade. Importantly, most of these reading problems can be prevented by providing students with interventions early during their academic careers (*Dynamic Indicators of Basic Early Literacy Skills (DIBELS)*, 2001).

Researchers have identified five big ideas in beginning reading that, when obtained, tend to result in successful reading. Three of these vital skills need to be obtained before reading is even possible (Baker & Kame'enui, 1994; Kame'enui, Simmons, Good, Harn, Chard, Coyne, Edwards, Wallin, & Sheehan, 2001; Coyne, Kame'enui, & Simmons, 2001; *DIBELS*, 2001). Information pertaining to the definition, development, and intervention guidelines will be presented for each of these three pre-reading skills. In addition, tools that are useful for assessing students' acquisition of these skills will be described. Finally, an early reading intervention program being implemented at a local elementary school will be evaluated to determine its effectiveness in instilling these pre-reading abilities in kindergarten students, which in turn, should reduce the number of students who experience reading difficulties in first-grade.

Big Ideas in Beginning Reading

The University of Oregon's National Center to Improve Tools of Educators (NCITE) has identified five principles that have proven to be effective in producing successful readers when used as guidelines for prevention and intervention programs (Baker & Kame'enui, 1994; Coyne et al., 2001; *DIBELS*, 2001). These five principles, which are referred to as *big ideas in beginning reading*, make up a framework for reading instruction that is beneficial for all students, including those who are at-risk for developing reading problems. Once children understand the big ideas, "small" ideas can usually be learned (Coyne et al.).

While the five big ideas are used to guide reading in its entirety, the first three ideas are necessary prior to learning how to read (Baker & Kame'enui, 1994; Coyne et al., 2001), and thus, need to be taught and understood while children are in the early elementary grades. The five big ideas in beginning reading are 1) phonological awareness, 2) the alphabetic principle, 3) fluency with text, 4) vocabulary, and 5) comprehension. While each of these big ideas needs to be grasped in order for readers to be successful, children develop an understanding of each of these ideas in a developmental sequence; thus, basic phonological awareness must be attained prior to the understanding of the alphabetic principle, and so on. Phonological awareness, the alphabetic principle, and fluency with text are the three big ideas that serve as prerequisites to reading (Baker & Kame'enui; Coyne et al) and are therefore the focus of this research. These ideas are further explained below.

Phonological Awareness

Definition. Phonological awareness is highly predictive of the ability to read and write. This construct refers to the understanding that speech consists of individual sounds. A phonologically aware individual is able to divide spoken language into its smaller parts (Chard & Dickson, 1999). Phonological awareness is not simply phonemic awareness. Phonological awareness is more encompassing than phonemic awareness. While phonemic awareness refers to the ability to recognize and manipulate sounds at the individual phoneme level, phonological awareness involves the ability to recognize and manipulate sounds at the phoneme, syllable, and word level. Thus, phonemic awareness is a small part of phonological awareness (*DIBELS*, 2001). To avoid confusion, phonological awareness will be used in reference to the ability to understand sound structure, regardless of the sound level.

Because phonological awareness involves breaking down words, the relationship between this construct and the ability to read and write is logical. When children realize that individual phonemes are found within words and that words are formed by blending phonemes together, they can apply the relationship between letters and sounds to read and write words (Chard & Dickson, 1999). Children who lack this realization, however, are likely to be deficient in phonological awareness. As a result, these individuals struggle when decoding single words and are likely to develop reading problems (Mash & Wolfe, 2001). Therefore, the development of phonological awareness when learning to read is crucial. Importantly, the development of phonological awareness also predicts academic achievement (Snider, 1995).

Development. Phonological awareness is considered a developmental construct, as certain skills develop before other skills (Chard & Dickson, 1999). First, preschool children develop an understanding of syllables, which leads to the recognition of even smaller units of speech such as alliterations and rhymes (Snider, 1995; Burt, Holm, & Dodd, 1999). The ability to recognize sounds that begin and end a word and the ability to rhyme are evident when children are able to change certain sounds within words and rhyme different words. For example, a child who recognizes alliterations can repeat the word *mat* without pronouncing the *m* sound. Once this recognition is achieved, he or she can then identify or match a word that rhymes with *mat*, such as *cat* (Mash & Wolfe, 2001). This skill is generally fully developed by the time children are in kindergarten (Roth Smith, 1998).

Next, children develop the ability to blend phonemes and to divide syllables (Ball, 1993). These skills typically develop towards the end of kindergarten or the beginning of first-grade (Roth Smith, 1998). For example, children demonstrate their ability to blend phonemes by combining sounds to form words. A child can blend the individual sounds made by *d, o, g* to form the word *dog* (Mash & Wolfe, 2001). This skill aids in the reading process by allowing beginning readers to sound out new words. The ability to divide syllables is expressed when children recognize the different sounds that make words or syllables such as *sack* (*s/ack*) (Ball, 1993).

Finally, the most complicated phonological awareness skill children develop is the ability to segment phonemes (Ball, 1993). This skill is typically attained during first-grade (Roth Smith, 1998). Children can divide words into single sounds and can delete,

substitute, and reverse sounds that are contained in words to form new words. For example, children delete sounds by saying a word such as *fish*, then repeat the word without the *f* sound. Students can substitute sounds by annunciating the *d* sound instead of the *f* sound in the word *fish;* thus they form a new word, *dish*. Reverse sounds are performed by saying a word such as *top*, then changing the *t* and *p* sounds around (Roth Smith, 1998). Sound segmentation is also displayed when children are able to say the sound that is at the beginning of a picture or word (Ball, 1993). For example, when shown a picture of a fish, the child can annunciate the *f* sound. Thus, phonological awareness skills exist at different levels of complexity and are developed over a period of time, typically by the time children finish first-grade (Roth Smith, 1998).

Intervention guidelines. While commercial interventions such as the Phonological Awareness Training for Reading program, the Sounds Abound program, and the Auditory Discrimination in Depth program have been designed to aid in the development of phonological awareness, teachers can develop their own interventions that can easily be included as part of the class material (Felton & Pepper, 1995). However, researchers recommend that teachers follow guidelines when engaging children in activities so that the development of phonological awareness can be maximized (Snider, 1995; Chard & Dickson, 1999).

Teachers who act as models when training children in phonological awareness increase the effectiveness of interventions (Snider, 1995; Chard & Dickson, 1999). Children attain these skills best when they are able to see the teacher perform tasks before they are required to engage in the tasks. Modeling the tasks makes the training more

explicit and more easily understood by those children who have not yet mastered the skill (Chard & Dickson). Based on the developmental hierarchy of phonological awareness, tasks related to this construct must be introduced sequentially from easy to hard, as each skill builds upon previously learned skills. In order to achieve phonological awareness, children must first recognize whole words and syllables before other related skills can be attained. Therefore, research suggests that children should be taught larger pieces of words before words are further broken down (Snider).

Even after teachers model the skills, providing the children with guided practice before expecting the children to perform the tasks independently improves skill development. Such practice activities may include learning stations or games (Snider, 1995). While some children develop phonological awareness skills through less intense instruction, those students who are at high risk of not developing these skills often do not (Chard & Dickson, 1999). Therefore, when training such skills, implicit instruction should be combined with explicit instruction. A combination of explicit and implicit instruction will ensure that all children at risk are provided with adequate training (Snider; Chard & Dickson; Schneider, Ennemoser, Roth, & Kuspert, 1999).

Along with recognizing the importance of modeling and explicit instruction, teachers are recommended to first provide children with examples that contain continuous rather than stop sounds (Chard & Dickson, 1999). Continuous sounds are elongated and include the sounds associated with all of the vowels and with the consonants *f*, *n*, *m*, *l*, *r*, *s*, *w*, *v*, y, and *z*. Stop sounds are more difficult to isolate, and consist of the sounds *b*, *d*, *c*, *g*, *h*, *k*, *j*, *q*, *p*, and *x*. These sounds

are pronounced differently when they are followed by a vowel sound. Therefore, it is important for teachers to make sure students annunciate the stop consonant sounds only, as any mispronunciations of these sounds can lead to problems when students begin to sound out words (Snider, 1995).

According to Snider (1995), when providing students with phonological awareness training, teachers are also recommended to introduce words with fewer phonemes before words that contain more phonemes. Words with two phonemes are easier to segment than words with three phonemes. However, once a child can successfully segment words with two sounds, he or she should be presented with words with three phonemes. These words should contain continuous sounds and stop sounds should only be presented after the child has mastered the words with continuous sounds. When the child has demonstrated that he or she is able to segment words with three phonemes that begin with continuous and stop sounds, words with four phonemes can be introduced. These words are more difficult, as the child is required to segment within words. For example, in order to say the word *slit*, a child needs to divide *sl* into two sounds. This task is considerably more difficult to perform than words with fewer sounds, such as *sit*.

With an understanding and adherence to these guidelines, teachers can apply specific interventions in their classrooms (Chard & Dickson, 1999). To teach the recognition of syllables within words, children first need to be able to identify words themselves. This identification can be determined by clapping once for each word pronounced in a sentence. In the beginning, the sentences should contain picturable words such as "Tommy ran home," and then sentences

can consist of abstract words as in the sentence, "Sammy went to work." Likewise, the same process should occur when teaching syllable segmentation after children have been successful at identifying words. When teaching syllable segmentation, however, the teacher and then the children will clap once for each syllable that exists within each word (Snider, 1995).

After a child is able to recognize words and syllables, he or she is ready to learn about alliterations and how to rhyme words. Card games are often used to teach these skills. For example, a card game can be created based on four main sounds, such as *t, p, s, l.* Each card might contain two different pictures. The children are asked to join cards that share beginning sounds, similar to a game of dominoes (Byrne & Fielding-Barnsley, 1995). Puppets also aid in the learning of alliterations. For example, a puppet named "Mr. B" only likes words that begin with the letter *b.* Thus, children are asked to name words with this particular beginning sound (Roth Smith, 1998). Another intervention might involve the teacher telling the children that one word begins with *m* and rhymes with *at,* then pronouncing the word *mat.* In addition, the teacher might say the other word begins with *r* and rhymes with *at,* then annunciate the word *rat* (Snider, 1995). Often times children are given a word such as *set* and are asked to decide which word *set* rhymes with out of a list of words, such as *jet, cat,* and *hill* (Roth Smith).

In addition, implicit instruction such as reading rhyming books or manipulating sounds in songs can be included along with explicit instruction when training rhyming skills (Snider, 1995; Chard & Dickson, 1999). Examples of such activities include reading nursery

rhymes while expecting the children to fill in the rhyming words, or singing songs such as *Row, Row, Row your Boat* with different sounds. In this song, each *r* might be replaced with a *t* (Chard & Dickson).

After children have demonstrated that they can recognize alliterations and rhymes, interventions can focus on blending phonemes (Ball, 1993). Such interventions might include providing students with the sounds and asking them to combine the sounds to create words. The teacher might say *s-u-n* so that the phonemes are discrete, and the children would then put the sounds together quickly to say the word *sun* (Snider, 1995; Chard & Dickson, 1999). A game such as the "Guess-the-Word Game" provides practice for blending phonemes. In this game, children view a small number of cards that contain pictures. One picture matches the word that the teacher says, which is pronounced using "Snail Talk." As the teacher says a word such as *ffffaaaannnn*, the children look at the pictures and decide which word is being said. However, the children should take turns announcing the answer to ensure that all children participate (Chard & Dickson).

Next, researchers suggest that interventions consist of activities that correspond with segmenting phonemes. These activities tend to be the exact opposite of those that deal with blending phonemes. For example, instead of pronouncing a word slowly so that all sounds are discrete, the teacher would begin by pronouncing a word quickly. Then, the children are asked to divide the word into its individual phonemes (Chard & Dickson, 1999). Sound boxes are frequently used to develop this skill. When using sound boxes, children place a token or a chip into a drawn box each time they hear a sound (Elkonin, 1973 as cited in Snider, 1995). Sound boxes have been

extended into word boxes to help children recognize the relationship between sounds and letters. When completing word boxes, children either place a magnetic letter or write a letter in the box each time they hear a sound instead of placing a token or a chip into a box (Joseph, 2000).

Finally, at the most difficult end of the phonological awareness hierarchy is the ability to delete, reverse, and substitute sounds found within words. As some researchers believe, this skill is developed because of, or along with reading. Thus, research suggests that interventions focused on this skill are not as critical as those that emphasize other skills (Snider, 1995). However, interventions will only promote the learning of this skill, so whenever time allows interventions can be applied. One intervention is labeled the "Change-a-Name Game" in which children recognize a word even when the teacher pronounces the word without the beginning sound. For example, the teacher might secretly choose Jessica's name and pronounce it as Essica. The children would then decide whose name was chosen. As this skill is developed, children are encouraged to delete initial sounds of other words and to pronounce the remaining sounds of the word. Eventually the children will be able to not only delete sounds, but also to substitute and reverse sounds as well (Chard & Dickson, 1999).

These interventions provide only a few of the possible creative activities that teachers can effectively implement in the classroom to improve phonological awareness in their students. While these interventions can easily be included in the classroom, each child is likely to develop certain skills at different times (Roth Smith, 1998). Therefore, teachers are encouraged to be careful when shifting from one

skill to the next, especially since each skill builds on previous skills (Snider, 1995). Furthermore, teachers are recommended to provide phonological awareness interventions everyday for about 10 minutes (*DIBELS*, 2001). Some research has shown that interventions such as the ones described above can be implemented effectively for as little as 10 minutes a day everyday of the week for a period of 6 months (Schneider et al., 1999). Other effective training programs have been in place for 11 weeks, with each weekly session lasting 25 minutes (Byrne & Fielding-Barnsley, 1995). While lessons provided during class lead to advancements experienced by some students, other children need help outside of the classroom. Thus, the amount of time and intensity devoted to such interventions varies (Felton & Pepper, 1995).

Alphabetic Principle

Definition. Once children begin to gain phonological awareness skills, the next big idea that needs to be learned is the alphabetic principle (Baker & Kame'enui, 1994; Coyne et al., 2001; *DIBELS*, 2001). Phonological awareness and the alphabetic principle are closely related, however, a distinction can be made; the alphabetic principle is associated with linking sounds with letters, while phonological awareness is concerned with the ability to hear and manipulate sounds that are found within words. Thus, the alphabetic principle entails the ability to interpret and use written stimuli, or letters (Baker & Kame'enui). While some researchers use the terms alphabetic principle and alphabetic understanding interchangeably (Baker & Kame'enui; Coyne et al.), Kame'enui et al. (2001) maintains that the alphabetic

principle consists of two parts, namely alphabetic understanding and phonological recoding.

Alphabetic understanding is defined as the ability to link sounds with letters; in other words, children must understand that alphabetic letters correspond to distinct sounds or phonemes (Baker & Kame'enui, 1994; Coyne et al., 2001; *DIBELS*, 2001). Students need to realize that all twenty-six letters of the alphabet are unique, as each letter represents a single sound (Coyne et al.). For example, when presented with the letter *d*, a child who has an alphabetic understanding can produce the sound that is associated with this letter. Furthermore, children who have an alphabetic understanding realize that individual letters are combined to form words and that letters are read from left to right (Baker & Kame'enui). The ability to recognize letter-sound associations is needed in order to identify words (Kame'enui et al., 2001).

According to Kame'enui et al. (2001), phonological recoding is the ability to use the relationships of letters and sounds to spell words or to pronounce an unfamiliar word or combination of letters. Phonological recoding is broken down into three parts, 1) regular word reading; 2) irregular word reading; and 3) advanced word analysis.

First, regular word reading involves the ability to read simple, unfamiliar words. To do this, children must be able to generate the sounds associated with certain letters and to blend these sounds together to form words. Basically, children need to be able transform speech into print through their understanding of phonological awareness and letter-sound associations (Kame'enui et al., 2001). A child who has reached this level of the alphabetic principle is able to blend the

sounds that correspond to each of the letters when presented with the word *mat* (Baker & Kame'enui, 1994; Coyne et al., 2001). Thus, the child can read the word. Being able to decode or sound-out words is critical to being a successful reader, as the English language consists of too many words to merely memorize (Kame'enui et al.).

The second component of phonological recoding is irregular word reading, which is the ability to read words that do not follow the typical rules for decoding. For example, special rules regarding letter-sound associations need to be employed to read words such as *the*, *was*, *none*, *right*, and *night*; the sounds found within these words are unique and can only be read after a student has been familiarized with these rules (Coyne et al.; Kame'enui et al.).

Finally, the third component of phonological recoding is advanced word analysis. This component involves the recognition of complex letter combinations, such as the word *lake*, where a string of letters contains a vowel-consonant-silent *e* (Kame'enui et al.).

Development. Although there are distinct components of the alphabetic principle that must be mastered to be a successful reader, the components tend to develop together beginning when children enter kindergarten. Specifically, kindergarten students should have attained letter-sound associations so that when shown a letter, they can produce the associated sound. In addition, kindergarteners usually can produce the sound that is most commonly associated with single letters. Their decoding skills typically consist of blending sounds to read short-vowel, one-syllable words such as *mat* or *sun*. Children of this age are also able to recognize some sight words, particularly those words that are high-frequency words. Examples of sight words that should be

identifiable to kindergarteners are *a*, *I*, *is*, *the*, and *my* (Kame'enui et al., 2001).

Building on the skills mastered in kindergarten, typical first-graders are able to produce the corresponding sounds of all twenty-six letters. Furthermore, these children should be capable of producing the sounds associated with certain combinations of letters, such as *th* and *sh*. By the time students are in first-grade they should also be able to sound out and blend consonants and other letter combinations found together within words, such as the *sk* in the word *mask* and the *oo* in *book*. Children at this level should also possess the ability to read regular words that have only one syllable, such as the word *chin*. First-graders should be able to read words with familiar word components such as *-ing*. Finally, these students should be recognizing more sight words that can be read automatically, such as *have* (Kame'enui et al., 2001).

Skills related to the alphabetic principle continue to develop throughout the second- and third-grades. However, since the proposed study is only examining the development of this big idea in kindergarten and in first-grade, the complexities of the alphabetic principle that develop in later grades will not be discussed. To learn how the alphabetic principle is discussed in these later grades, readers should refer to Kame'enui et al. (2001).

Intervention guidelines. Letter-sound instruction should be provided along with training in phonological awareness (Felton & Pepper, 1995; Snider, 1995; Kame'enui et al., 2001); thus, many interventions overlap in teaching these big ideas. While auditory tasks such as blending and segmenting do not require students to read

alphabetic symbols, these tasks aid in their understanding of how the sounds related to these symbols are put together. Thus, blending and segmenting tasks assist children in their abilities to sound out words. Therefore, teachers should teach sounds and their relationship to letters at the same time as auditory tasks such as blending and segmenting. These sounds need to be continually reviewed and presented slowly to ensure that students are able to identify each sound. However, sounding out tasks should not be introduced until the students are able to segment words auditorily and have learned enough letter-sound relationships to form words (Snider, 1995).

Like many phonological awareness interventions, the alphabetic principle can be taught through activities that focus on initial sounds in books, songs, and other environmental cues. Interventions that are more specific to teaching the alphabetic principle consist of reading and writing tasks, along with exposure to print in the classroom. Charts, letters, lists, and schedules also aid in the understanding of the alphabetic principle. Finally, children should be exposed to print through games, magnetic letters, and flashcards (Reutzel, 1992).

Regardless of the particular intervention used, children should first be exposed to letter-sound associations that are dissimilar and that occur in many words. These letters should also be linked with continuous sounds and are learned best when presented in lower case before upper case print, unless the printed forms are similar, such as with the letter *c* (*C*) (Kame'enui et al., 2001).

Fluency with Text

Definition. Fluency with text is the third big idea in beginning reading and is sometimes referred to as automaticity with the code

(Baker & Kame'enui, 1994; Coyne et al., 2001). Fluency with text is one's fluent ability to translate letters into sounds, and then to translate these sounds into words. To be fluent with text also means that the reader reads words without any cognitive effort, thus reading is automatic. The skills related to phonological awareness and the alphabetic principle have been mastered almost to the point that they have been overlearned; as a result, such skills are automatic and require no conscious attention (Baker & Kame'enui, 1994; Coyne et al., 2001; Kame'enui et al., 2001).

Importantly, fluency with text is a critical milestone to reading comprehension. Being able to read fluently allows other resources to be used to process meaning from the text (Baker & Kame'enui, 1994; Coyne et al., 2001; Kame'enui et al., 2001). Specifically, when the skills related to phonological awareness and the alphabetic principle are performed automatically and quickly, readers can apply more cognitive resources to derive meaning from a word and/or sentence (Coyne et al.). Research shows that poor readers fail to decode words as completely or efficiently as successful readers, which limits their ability to recall necessary information and to comprehend the text (Baker & Kame'enui).

When faced with reading, students are often challenged at different levels depending on the extent to which they have mastered phonological awareness and alphabetic principle skills. An accuracy percentage is typically calculated to determine the appropriate level of text with which a student should be presented. To find a student's percent of reading accuracy, the number of words that are read correctly is divided by the total number of words read. A student who

is reading with 97% accuracy is at the independent reading level, which means that he or she can fluently read this type of text without any problems. An instructional level is maintained when a student is reading with an accuracy rate between 94% and 97%. Finally, a student is reading at a level of frustration when he or she demonstrates an accuracy of 93% or lower. Fluency with text is best developed when students are given opportunities to read material that can be read with at least 95% accuracy, or when the student is reading at an instructional or independent level (Kame'enui et al., 2001).

Development. Like the skills associated with phonological awareness and the alphabetic principle, fluency with text is developed over time. Typically, though, students do not begin reading until first-grade, as they have to develop skills in the previous two big ideas first. As a result, fluency with text is not usually assessed until students are in first-grade. Upon entering first-grade, students should be able to accurately read connected text that is appropriate for their grade level, meaning that they can read 20 words and only make 1 error. During the middle of the year, typical first-graders are able to fluently read appropriate connected text; fluent readers read 1 word every 2 or 3 seconds. By the end of the year, first-graders should be reading 1 word each second. Additionally, students begin to read according to the punctuation at the end of sentences. Finally, most first-graders begin to reread connected text so that they become more familiarized with words and increase their reading fluency. While rereading, self-correction often takes place (Kame'enui et al., 2001).

Fluency with text generally begins in first-grade and continues to develop throughout third-grade (Kame'enui et al., 2001). However,

since the scope of the proposed study does not extend beyond first-grade, later developmental norms will not be discussed. Importantly, though, educators must be aware of how students are progressing as fluent readers, as this skill is a prerequisite for successful reading in later grades when the texts become more difficult to read; fluency with text needs to be achieved by the time children finish third-grade in order to prevent later reading difficulties.

Intervention guidelines. To promote fluency with text, students need to engage in reading material that is read with at least 95% accuracy, or at the instructional level. Children should have ample opportunities to read a specific passage or text repeatedly in short sessions lasting anywhere from 15 to 30 minutes. In addition, fluency with text is established when students are provided with feedback related to their reading performances (Kame'enui et al., 2001).

Importance of Big Ideas in Beginning Reading

Unfortunately, not all children develop the skills necessary to be phonologically aware, to understand the alphabetic principle, or to read fluently. Without proper identification of these individuals, they are at risk of not being able to read. In addition, these children are likely to exhibit discrepancies between their academic achievements and abilities once they begin school, which is likely to result in these children being labeled as learning disabled. However, through early screening procedures, children who lack the required skills in phonological awareness, the alphabetic principle, and fluency with text can be identified and early interventions can be implemented to reduce the academic problems these students might otherwise face

(Baker & Kame'enui, 1994; Coyne et al., 2001; Felton & Pepper, 1995; Kame'enui et al., 2001).

Assessment

Screening children for deficits in any of these three big ideas in beginning reading is necessary in order to minimize the number of students who experience reading problems in later grades. Importantly, screening needs to be conducted even before a child begins to learn how to read, as skills related to both phonological awareness and the alphabetic principle need to be developed before a child can learn to read and be fluent with text. Since the acquisition of phonological awareness and alphabetic principle skills are not as easily identifiable as reading itself, many students who lack this awareness are unnoticed until they demonstrate poor reading abilities. If educators wait to intervene after a child has consistently demonstrated poor reading abilities, the child will not likely demonstrate adequate academic progress that is comparable his or her peers. As a result, he or she is much more likely to be unsuccessful in school. On the other hand, if educators recognize the value of early screening and intervention practices, children who lack the prerequisite skills for reading will be given more opportunities to attain these skills, thereby increasing their chances of being skilled readers and successful students in later grades.

However, screening can be difficult to implement in schools, as such procedures are often time consuming, difficult to administer, and costly. In order for educators to effectively implement early screening and assessment procedures, researchers have proposed that assessment tools follow 11 different criteria (Deno, 1985; Kaminski &

Good III, 1998; Marston, 1989). Specifically, assessment tools should be 1) reliable and valid; 2) simple to administer; 3) easy for school personnel, parents, and students to understand; 4) time- and cost-efficient; 5) able to show vital signs of skill growth; 6) sensitive to changes in performance over time; 7) sensitive to short-term changes in performance due to an intervention; 8) relevant to the experienced instruction or curriculum; 9) obtainable in multiple forms; 10) measuring production-type responses; and 11) applicable to a variety of academic decisions (Deno; Kaminski & Good III; Marston). If these criteria are met, the assessment devices will not only provide educators with useful information, but it seems likely that such tools will be favored by teachers and school administrators as well. In addition, screening and assessment procedures should adhere to the problem-solving model so that any obtained data can aid in the problem-solving process (Kaminski & Good III).

Fortunately, measures that meet each of these 11 criteria do exist and can be extremely useful in the problem-solving processes that take place in schools. Such measures include the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) and curriculum-based measurement (CBM), which although are similar in many ways, are also two unique assessment tools that can be used to assess students' individual attainment of skills in each of the three big ideas in beginning reading (Deno, 1985; Kaminski & Good III, 1998; Marston, 1989).

Dynamic Indicators of Basic Early Literacy Skills

The DIBELS is a functional assessment tool that consists of standardized measurements used to assess phonological awareness, the alphabetic principle, and fluency with text in children who are in

kindergarten through third-grade. In addition to measuring these three big ideas in beginning reading, the DIBELS also consists of a letter-naming fluency measure, which is highly predictive of reading ability in later grades (*DIBELS*, 2001; Kaminski & Good III, 1998). Because these pre-reading skills are developed over time, the DIBELS is designed so that these skills are measured at developmentally appropriate times throughout these grade levels (*DIBELS*, 2001). The DIBELS is easily administered to all students and aids in the identification of students at-risk of experiencing reading problems, allowing for the implementation of early interventions designed to prevent reading failure (*DIBELS*, Kaminski & Good III, 1996; Kaminski & Good III, 1998).

Whether measuring one's development of skills related to one of the three big ideas or to letter naming fluency, this screening tool is made up of individually administered early literacy measures that require only about 1 minute per student to administer, and only about 3 minutes per student to administer and score. Educators are advised to assess all students on the developmentally appropriate measures three to four times a year, depending on the school's academic calendar. In addition to these regular assessment periods, the DIBELS includes progress monitoring probes that can be used weekly. Appropriate benchmarks, or performance goals that children are expected to reach by certain time periods (Coyne et al., 2001), are provided so that educators can better predict how the students are progressing. Another convenience is that most of the school personnel can be easily trained to reliably administer the DIBELS (*DIBELS*, 2001), which is discussed later in more detail.

Once the DIBELS has been administered and scored, the scores can be recorded on the DIBELS website (http://dibels.uoregon.edu) for $1.00 per child and the computer will analyze the scores and determine which one of three instructional supports each child needs (*DIBELS*, 2001). The levels of support include benchmark instructional support, strategic instructional support, and intensive instructional support (*DIBELS*; Good III, Gruba, & Kaminski, 2002).

Children who are performing at developmentally appropriate levels are likely to be identified as needing benchmark instructional support. Good III et al. (2002) advise that students who are classified under this level of support need to be progress monitored three times per year, during the school-wide DIBELS administration times. In addition, these students need to receive 20 minutes of pre-reading instruction throughout the day at least four days a week. This instruction can be provided in small or whole groups; a recommended curriculum for phonological awareness is *Phonemic Awareness for Young Children* (Good III et al.).

The second type of instructional support that a child may be associated with is strategic instructional support. Children who need strategic support should be progress monitored once a month or once every two weeks, depending on the individual's need. Students should receive the same instruction that those students in the benchmark instructional support group receive, but they should also experience extra sessions as based on individual need. Furthermore, these students should receive extra instruction in small groups consisting of approximately five students (Good III et al., 2002).

Finally, the third type of support students might be identified as needing is known as intensive instructional support. Students in this group need to be progress monitored once every week. In addition to receiving the same instruction as those students in the benchmark instructional support group, these students also need instruction four times a week for 20 minutes; this extra support should be provided in small groups of approximately three students. These children should be experiencing support and practice in their homes as well (Good III et al., 2002).

Importantly, when the DIBELS is administered three or four times a year, a student's needed level of support can change from one administration time to another. Ideally, through progress monitoring, every child will improve his or her skills and will decrease the amount of support that was initially needed. Progress monitoring also allows the instruction to be modified according to an individual child's needs so that the goal of increasing each student's pre-reading skills will be attainable (Good III et al., 2002).

Even though the DIBELS can be used to identify students with individual support needs through third-grade, only the measures used in Kindergarten will be discussed in detail, as the proposed study does not include measures beyond this level.

Phonological awareness. The DIBELS consists of two different measures of phonological awareness (*DIBELS*, 2001). Together, these measures assess both analysis and synthesis tasks, which have proven to effectively predict the development of phonological awareness. Analysis tasks consist of (a) sound isolation, (b) sound segmentation, (c) word-to-word matching, and (d) word segmentation, whereas synthesis

tasks include (a) sound blending and (b) phoneme synthesis (Majsterek & Ellenwood, 1995).

The first DIBELS measure of phonological awareness is Initial Sounds Fluency (ISF), which should be administered to preschoolers in the fall, winter, and spring, and to kindergarteners during the fall and winter. The ISF measure is used to assess a student's ability to identify and produce the first sound in a word that is orally presented (*DIBELS*, 2001). The lowest performing kindergarteners should be able to identify and produce at least 25 initial sounds in one minute (Good III et al., 2002). This measure is supported by an alternate-form reliability of 0.72 during the winter of kindergarten; however, after conducting four assessments of the ISF measure, the reliability increases to 0.91. The predictive validity of this measure with the CBM reading probes that make up the Oral Reading Fluency (ORF) measure used with the DIBELS is 0.45; the ORF task is usually administered in the spring of first-grade (*DIBELS*).

The second measure of phonological awareness is the Phoneme Segmentation Fluency (PSF) measure. Educators are advised to administer this section of the DIBELS to kindergarteners during the winter and the spring, and throughout first-grade. When given the PSF measure, a child's ability to fluently segment orally presented words consisting of three and four phonemes into individual phonemes is assessed (*DIBELS*, 2001). The lowest performing kindergarteners should be able to segment at least 35 phonemes per minute; students who score below a 10 on this measure in the spring might need intensive support (Good III et al., 2002). The PSF task maintains an alternate-form reliability of 0.88 over two weeks and of 0.79 over one month during

the spring of kindergarten. The predictive validity of the PSF measure when it is administered during the spring of kindergarten with the CBM reading or ORF task during the spring of first-grade is 0.62 (*DIBELS*). While this measure has evidence of reliability and validity, interrater reliability is questionable, as this is the most difficult measure to score; scoring on the PSF measure requires the assessor to make more interpretations and judgments than any of the other DIBELS measures.

Although not a direct assessment of phonological awareness, the DIBELS also consists of a Letter Naming Fluency (LNF) task. Through the LNF task, a student is presented with both lower- and upper-case letters in a random order. The student is then given 1 minute to name the letters as they are presented. This task is generally completed during the fall, winter, and spring of kindergarten, and during the fall of first-grade (*DIBELS*, 2001). Kindergarteners are thought to be at-risk for being poor readers if they score in the bottom 20% of children in their district (Good III et al., 2002). The alternate-form reliability of this measure is 0.88 over a period of 1 month during kindergarten. The score achieved on the LNF task maintains the predictive validity score of 0.71 with CBM reading performance in first-grade (*DIBELS*). Although this task does not directly assess phonological awareness, LNF has demonstrated a high correlation with reading ability in later grades (*DIBELS*; Kaminski & Good III, 1996; Kaminski & Good, 1998) and is used in combination with other DIBELS measures to indicate the level of intervention a child needs (*DIBELS*). It seems that LNF is a skill that is somewhere between those related to phonological awareness and the alphabetic principle, as phonological awareness is merely an understanding and identification of sounds

without the presentation of letters, and the alphabetic principle involves associated sounds with letters. While LNF does not assess a child's ability to name a sound associated with a letter, it requires them to identify the names of letters, which seems like a first step to developing associations between letters and sounds. Importantly, though, while the DIBELS does not recognize LNF as a skill that directly measures phonological awareness or the alphabetic principle, this assessment device does recognize the importance of this skill and uses a LNF measure in combination with other measures to determine a child's need (*DIBELS*).

Alphabetic principle. The DIBELS assesses the alphabetic principle through a Nonsense Word Fluency (NWF) measure, which is typically administered during the winter and spring of kindergarten and then in the fall, winter, and spring of first-grade. This tool provides a measure of a student's ability to associate letters with sounds and to blend or combine letters into words (*DIBELS*, 2001). The lowest performing kindergarteners should be able to combine at least 50 letters and sounds in the spring (Good III et al., 2002). The NWF task has consistently demonstrated an alternate-form reliability of 0.83 over a period of one month during the winter of first-grade. Finally, the administration of this measure in the winter of first-grade has predictive validity index of 0.82 with the CBM ORF (Oral Reading Fluency) score in the spring of first-grade (*DIBELS*). No reliability or validity data on this task was found for students in kindergarten; however, the data found in later grades appears promising and suggests that earlier scores could very well be informative.

Curriculum-Based Measurement

Like the DIBELS, CBM consists of a set of standardized procedures and provides data that can be used to make decisions within the problem-solving model used in the schools (Deno, 1985). All of the assessment materials are derived from the curriculum being taught; therefore, different schools will use different materials (Paulsen, 1997). Teachers and school personnel can be easily trained to administer CBM. This type of assessment easily provides teachers with multiple, direct measures of students' performances as they relate to the curriculum. The measured skills include production-type responses that give the examiner opportunities to observe how the responses are derived and thus, where problems are experienced (Marston, 1989).

Within the problem-solving model, CBM data is useful for screening, designing interventions, evaluating an individual student's progress, and evaluating programs and interventions (Deno, 1985; Madelaine & Wheldall, 1999; Marston, 1989; Paulsen, 1997). Materials can be administered to all students so that those individuals at-risk of experiencing academic problems can be identified and interventions can be put in place. By administering CBM to all students within a classroom, normative data can easily be collected in the fall, winter, and spring. Such data permits educators to compare students' performances within the classroom. Another way of collecting and interpreting data is to compare a student's performance to a set criterion (Tindal, 1989). Regardless of whether norm- or criterion-referenced assessments are conducted, global or long-term goals are assessed through CBM; therefore the material's degree of difficulty does not typically change from assessment time to assessment time

throughout a given year (Madelaine & Wheldhall). Another advantage of using CBM is the ease of progress monitoring, which allows teachers to document a student's progress and to modify interventions or instruction as needed (Paulsen). Finally, as alluded to, a student's performance can be evaluated according to the school curriculum, his or her individual performance over time, and to his or her peers (Deno; Marston; Paulsen).

Fluency with text. Fluency with text is one academic skill that is commonly assessed through CBM to provide an indication of one's reading ability (*DIBELS*, 2001). Deno, Mirkin, & Chiang (1982) found that oral reading is a reliable and valid indicator of reading ability. Following the CBM model, oral reading consists of reading aloud selected passages from the curriculum. The number of words read or decoded correctly in 1 minute serves as the performance measure (Deno et al.; Deno, 1985; Madelaine & Wheldall, 1999).

Importantly, Deno et al. (1982) found that such assessments only require 1 minute to provide meaningful information; within this amount of time, discriminative validity was also found as unsuccessful readers performed significantly different from successful readers. An effective way to distinguish between unsuccessful and successful readers is to calculate each student's reading accuracy, which will determine whether he or she is reading at an independent, instructional, or frustrational level (Mirkin & Deno, as cited in Fuchs & Deno, 1992; Kame'enui, 2002; Madelaine & Wheldall, 1999).

Current Study

Werth (2002) has demonstrated that students lacking phonological awareness and other pre-reading skills are accurately identified by the

DIBELS and that experiencing such interventions results in fewer academic problems in later grades; however, more research is needed to determine how well programs can be fully implemented in school settings. A gap exists between research and practice in that research supports school-wide intervention programs, but little applied research has been conducted (O'Hearn-Curran, 1999). Furthermore, studies examining the correlation between at-risk children as identified by the DIBELS who receive interventions in kindergarten and CBM reading performance in first-grade are needed. The present study contributes to the fields of school psychology and education by helping to fill the void that has long existed between contrived research and applied practice.

Specifically, the current study was conducted to evaluate an early literacy program being implemented in a local elementary school. Through this program, every kindergarten student was administered the DIBELS to assess his or her attainment of early literacy skills. The students who scored low received interventions aimed to teach pre-reading skills, with the main focus on phonological awareness skills. The next year, when in first-grade, these students were then administered CBM reading probes that corresponded to the school's curriculum. While the DIBELS consists of Oral Reading Fluency (ORF) measures that are typically given in first- through third-grades (*DIBELS*, 2001), this local program used the DIBELS only in kindergarten, and began using its own CBM reading probes in first-grade.

Through this study, a variety of questions were answered to provide information about the effectiveness of this particular program.

First, did the students who received the small group interventions in kindergarten reach their DIBELS goals by the end of the kindergarten school year? In other words, were the interventions effective at helping students attain pre-reading skills by the end of the year? In answering this question, the timing of the small group interventions was examined to determine if the interventions were more effective depending on if they were received not at all, first semester, second semester, or all year. Students receiving special education services were also considered. Finally, what was the overall effectiveness of this program in maximizing the number of these students who reached their CBM reading goals in first-grade? Data examining the reading level of students in first-grade were provided to answer this question.

I hypothesized that the interventions would result in most of the students reaching their goals by May of their kindergarten year. Research has demonstrated that children at risk of not developing skills in these areas can successfully attain such skills with extra practice and instruction (Baker & Kame'enui, 1994; Kame'enui et al., 2001; Byrne & Fielding-Barnsley, 1995; Coyne et al., 2001; *DIBELS,* 2001; Felton & Pepper, 1995; Reutzel, 1992; Schneider et al., 1999). Finally, I predicted that the literacy program would result in the majority of students reaching their reading goals in first-grade; more specifically, most students will be reading at an independent or instructional level rather than a frustrational level in September of their first-grade year. Phonological awareness and alphabetic principle skills have consistently been shown to correlate with reading ability (Baker & Kame'enui; Kame'enui et al.; Coyne et al.; *DIBELS;* Mash & Wolfe, 2001; Snider, 1995); thus, by establishing these skills

in kindergarten, students should be better able to read as they start first-grade and should be reading at the independent or instructional level rather than at the frustrational level.

Method

Participants

All participants attended an elementary school in a small Midwestern town. One hundred thirty-five students participated in this study as kindergarteners; however, 7 of these students' data were not analyzed because they did not clearly fit into any of the intervention categories (explained below). Thus, 128 kindergarten students' performances on the DIBELS were included in the analyses. Of these kindergarten students, 59 were males and 69 were females. In September, the participants' ages ranged from 5 years 0 months to 7 years 0 months, with an average age of 5 years 8 months.

Participants' scores on DIBELS measures determined to which of the following intervention categories they were assigned: the no intervention group, the first semester intervention group, the second semester intervention group, or the all year intervention group. Any student identified as needing special education services at any time throughout the kindergarten year was assigned to a fifth group, termed the special education intervention group; this group received interventions in pre-reading skill that were different from the other groups in that these interventions focused only on initial sounds.

Table 1 contains the demographic data of the kindergarten participants, all of whom spoke English as their native language. Of the 128 kindergarten participants, 1 from the all year intervention group was retained in kindergarten and thus was unable to continue with

the study in first-grade. Other students were also unable to participate in the study as first-graders due to events such as moving during the summer; a total of 4 students were lost from the no intervention group, 1 from the second semester intervention group, 1 from the all year intervention group, and 3 from the special education group. Therefore, only 119 of the students who participated in the kindergarten DIBELS assessments were available to participate as first-graders. The first-grade participants consisted of 54 males and 65 females whose ages in September were between 6 years 0 months and 8 years 0 months, with an average age of 6 years 8 months. The students' average ages from each intervention group did not change after the sample sizes were reduced. One hundred sixteen of these students were Caucasian, 1 was Hispanic, 1 was Asian, and 1 was Native American.

Other participants included school personnel, namely, the school psychologist, home-school interventionist, speech-language pathologist, and special education teachers. These individuals administered the DIBELS measures and the CBM reading probes to the students. All of these participants were Caucasian, females, and native English speakers.

Setting

All components of this study occurred at an elementary school in a Midwestern town. The DIBELS screening took place in the multipurpose room. All students experienced instruction in the three big ideas in beginning reading in their general education classrooms, while the kindergarten special education teacher's room served as the setting for the additional small group interventions. The progress made by the students receiving additional small group interventions was measured

weekly at various sites throughout the school, such as in the hallway or empty rooms.

Like the DIBELS screening, the CBM was administered in the multipurpose room. The CBM data were collected by the same people who administered the DIBELS assessments.

Materials

The materials required for this program were related to both the DIBELS and CBM, which have already been described in the literature review. Each assessor had pictures that corresponded with the DIBELS screening and progress monitoring booklets. DIBELS booklets were provided for each kindergartener. The kindergarten special education teacher had progress monitoring booklets for every child receiving additional interventions. Included in these booklets were graphs, so that students' progress from assessment time to assessment time could be charted. Access to the DIBELS website at http://dibels.uoregon.edu was also provided so that each child's scores could be recorded and evaluated. Three first-grade CBM reading probes derived from the Houghton-Mifflin curriculum were needed per assessor for the students to read. An additional three first-grade CBM reading probes were required per child, so that the assessors could record scores. Each assessor needed a stopwatch.

A questionnaire (see Appendix) was completed by each kindergarten teacher in which interventions were described. The questions included on this questionnaire reflected the hierarchy of phonological awareness skills, along with questions related to the alphabetic principle. Additionally, this questionnaire was designed to provide information regarding the way in which instruction was delivered in the 7 different

classrooms, and to provide information about the differences that exist between the phonological awareness and alphabetic principal activities that occur in the general education classrooms and in the outside small group sessions provided by the special education kindergarten teacher.

Procedures

The appropriate DIBELS measures were administered individually to all kindergarteners in September, January, and May by any available school personnel, including regular education teachers, special education teachers, the school psychologist, and the guidance counselor. All assessors were trained on how to administer the materials prior to their administration times.

Since a hierarchy of phonological awareness skills exists and some skills need to develop before others, certain DIBELS measures were administered at specific times throughout the school year. In September the students completed the ISF (Initial Sounds Fluency) and LNF (Letter Naming Fluency) measures. When administering the ISF, the assessor showed the student four different pictures, named the item portrayed in each picture, and asked the student to state the name of or point to the picture that started with a certain sound. In addition, the student was asked to provide the initial sound of one of the pictures after hearing the assessor state the name of the item found in a picture. The number of seconds taken to respond after being asked the question was recorded as were the number of correct responses. The final score was calculated by multiplying the number of correct responses by 60 and dividing this number by the time taken by the child to respond; thus, this score represents the number of correct responses per minute. When presented with the LNF measure, the student

saw both lower- and upper-case letters that were randomly arranged on a page. The child was asked to name the letters and was told that the assessor would state the letter's name if he or she was unsure of the name. The child was given 1 minute to name all of the letters that he or she could name. The final score equals the number of correctly named letters in 1 minute (*DIBELS*, 2001).

Both the ISF and LNF measures were administered again in January, along with the PSF task. When administering the PSF task, the assessor verbally stated words that consist of three or four phonemes. Then, the student was asked to pronounce the single phonemes found within the word. The student received one point for every correct phoneme he or she segmented. The final score was calculated like that of the ISF measure. The number of correct responses was multiplied by 60, and this number was then divided by the number of seconds taken to respond (*DIBELS*, 2001).

In May, the LNF and PSF tasks were administered to all students once again, along with the NWF task. The procedures with the LNF and PSF tasks were identical to those during previous administration times. When performing the NWF task, the student viewed a page of consonant-vowel-consonant (CVC) and vowel-consonant (VC) nonsense words, such as *wek* and *hu*. The student was then required to read the nonsense word. The child was allowed 1 minute to provide as many responses as possible. The correct number of responses equals the final score (*DIBELS*, 2001).

After each of these three screening periods, each student's scores were calculated by the assessors and were recorded in their booklets. The school psychologist then entered these scores on the

DIBELS Data System, which is an additional service provided on the DIBELS web page, costing the school only $1.00 for each child per year. This data system analyzes the data according to quarterly benchmarks or goals and generates reports indicating the type of support each child needs. Specifically, lists are created that specify which students need intensive instructional support, strategic instructional support, and benchmark instructional support (*DIBELS*, 2001). Because one's scores might have changed from one assessment time to another, his or her recommended support level might have varied throughout the year; as a result, some students received a full year of additional interventions, while other students received additional support for approximately 4 months either during the first semester or the second semester.

All but 1 of the students identified as needing intensive instructional support received interventions in pre-reading skills from the kindergarten special education teacher for 20 to 30 minutes every other day; the student identified by the DIBELS as needing intensive instructional support who did not receive the small group interventions demonstrated knowledge of pre-reading skills in the general education classroom on a daily basis. Thus, this student's teacher expressed no concern and was surprised at her DIBELS performance. Students not identified as needing intensive instructional support but who were identified by their teacher as needing additional instruction in pre-reading skills also received interventions in these small groups from the kindergarten special education teacher. As a result, the numbers of students identified as needing strategic instructional support who were included in the small intervention groups were as follows: 3 of

the 8 students in the first semester group; 2 of the 5 students in the second semester group; and 5 of the 6 students in the all year group (these students were identified as needing intensive instructional support first semester and strategic instructional support second semester).

These interventions were provided in groups of 4 or 5 students and strongly emphasized instruction in phonological awareness. While skills related to the alphabetic principle were also included in the small group interventions, such skills are often acquired through the presentation of letters and other related visual stimuli in phonological awareness building activities; thus, when engaging in phonological awareness activities, the students were also exposed to letters as they learned sounds. Importantly, in March the special education teacher was assisted by a classroom associate, allowing for these already small groups of 4 or 5 students to be divided in half so that the special education teacher worked with 2 or 3 students for about 15 minutes of the allotted time while the associate worked with the remaining students; then, halfway through the session, the special education teacher and the associate would switch students so that they each worked with all the students. Having an associate also allowed the special education teacher to work individually with students on an as-needed basis.

Students in special education experienced a unique set of interventions; these students met with the kindergarten special education teacher everyday for 45 minutes. During this time, the students were exposed to activities relating to the *McMillan Big Book Series*, phonemic awareness activities, and instruction linking sounds

with letters. Although not a direct focus of this study, the students in this group were included to learn more about any differences that may or may not exist between students qualifying for special education and students in any of the small intervention groups.

While every student experienced related activities in the general education classroom, each classroom was exposed to different curriculum materials and lengths of instruction. Therefore, in order to accurately account for the effects of the interventions received outside of the general education classroom, each kindergarten teacher, including the special education teacher providing the additional interventions, completed a questionnaire regarding the pre-reading instruction being provided in her classroom; these questionnaires were completed in May at the end of the student's kindergarten year. The questionnaires allowed the teachers to list the activities, instructional programs, and intervention guidelines used in their classrooms. In addition, the teachers were asked to estimate the amount of time that was spent on such activities on a weekly basis.

Finally, once in September and once in January of the following year, CBM reading probes derived from the Houghton-Mifflin curriculum being used by this school were administered to this group of students; these students were then in first-grade. Individually, every student read three passages for 1 minute each. The student was told to try to read each word, but if he or she came to an unknown word, the assessor would state the word after 3 seconds. The assessor had his or her own copy of passages on which the words read incorrectly were circled or crossed out. The final score was the median number of words read correctly in 1 minute (Marston, 1989). Students were identified as

meeting their reading goals when their median number of words read correctly placed them at the third quartile or above; thus, a student reached his or her reading goal when he or she was reading as well or better than 50% of the other students (from all 5 groups combined). Additionally, each student's reading accuracy was calculated by dividing the number of words read correctly by the total number of words read. These numbers were derived from the student's median number of words read correctly; in cases where the student's median number of words read per minute was the same score on more than 1 reading probe, the accuracy rate on all 3 probes was calculated and the median accuracy rate was used.

Data Analysis

The questionnaires completed by each of the kindergarten teachers were qualitatively examined to determine any instructional differences that might have existed in the 7 general education classrooms. Furthermore, the data gathered from these questionnaires were used to help identify differences between the instruction experienced in the general education classrooms and the instruction experienced by the groups receiving additional interventions by the special education teacher.

Intervention categories were created so that examinations of the relationship between the timing of the interventions and performances on the May DIBELS measures could be made. These intervention categories were defined as having experienced the interventions 1) not at all; 2) first semester (between the DIBELS assessments in September and January); 3) second semester (between the DIBELS assessments in January and May); 4) all year (for the entire academic year between the

DIBELS assessments in September and May); and 5) through special education services.

The number and percentage of students from each intervention group meeting the May DIBELS benchmarks for Letter Naming Fluency (LNF), Phoneme Segmentation Fluency (PSF), and Nonsense Word Fluency (NWF) were found. Graphs were created to show each student's DIBELS score on the January Initial Sounds Fluency (ISF) measure, as well as each student's DIBELS score on the May DIBELS measures. For each measure, individual performances were graphed according to the intervention group they experienced.

The mean scores, standard deviations, and score ranges on each DIBELS measure were calculated for each intervention group. Furthermore, gain scores for each DIBELS measures were found for each student so that the mean performance gains, standard deviations, and gain ranges could be found for each intervention group.

Each student's median reading performance on CBM reading probes was ranked and categorized into a quartile by intervention group in both September and January. Each quartile consisted of 30 students, except the fourth quartile, which consisted of 29 students. The median number of words per minute and the mean number of words per minute read by the entire participant pool (all 5 groups combined) in both September and January were also found, along with the standard deviation. Furthermore, the number of students from each intervention group who were reading at the independent, instructional, and frustrational levels in September and January was determined. These levels were based on each student's accuracy rate; students reading at the independent level when they read at least 97% of the words

accurately, at the instructional level when they read between 94% and 97% of the words accurately, and at the frustrational level when they read 93% or fewer of the words correctly. The reading accuracy rate of each student was calculated for both September and January and is shown by intervention group. In addition, the mean number of words read per minute was calculated for each time the CBM reading probes were administered (September and January). These means were found for the students in each intervention group.

Results

Teacher questionnaires. In general, most of the 6 general education teachers' responses on the questionnaires indicated that kindergarteners engaged in activities related to phonological awareness and the alphabetic principle throughout the day all year long. However, different responses indicated that some of the skills range from being taught throughout the day all year long to once a week during the second semester. Generally, the skills being taught less often and later in the year, such as identifying initial and final sounds and blending phonemes, were the skills that required the attainment of easier skills. Additionally, response patterns show that when skills were taught less often, more time was spent on instructing in these areas. The amount of time spent engaging in activities aimed at building pre-reading skills typically ranged from a few minutes everyday to 90 minutes a week.

Importantly, trends were noticed when evaluating the teacher responses that suggested certain activities were used to teach students a variety of pre-reading skills. For example, the teachers engaged their students in nursery rhymes, matching picture games, poems,

related worksheets, singing songs, rhyme baskets, name rhyming, rhyming with current vocabulary words, and letter people to teach many different skills. All teachers reported engaging their students in writing and reading "Chapter Stories." Specifically, the students dictated a story and the teacher wrote the story on the board; the teachers emphasized phonological awareness and alphabetic principle skills during these activities. Other related activities included guided reading, portfolio writing, literacy centers, sentence strips, exposure to books, and modeled writing. While some teachers used solely their own creative ideas to teach pre-reading skills, other teachers used a variety of combinations of the following programs: *Phonemic Awareness Songs and Rhymes, Dr. Jean,* and *Phonemic Awareness for Young Children.*

Importantly, the students who received small group instruction in pre-reading skills received this instruction in addition to the pre-reading activities provided in their general education classrooms. One teacher did note that the students in her classroom getting the small group interventions missed out on the small group activities that the rest of her class experienced through her general teaching practices; thus, the students in need of interventions who received small group pull-out instruction received less of the pre-reading instruction in their general education classroom. However, all other students receiving the small group interventions did so in addition to the activities provided in the general education classrooms.

Based on the questionnaire data, the small group interventions were similar to those provided within the general education classrooms; however, in general, the students in these groups experienced more

interventions that were provided in smaller groups. The estimated time students spent receiving these small group interventions was typically about 40 to 70 minutes per week. The instruction these students were provided focused mostly rhyming during the first semester, and mostly on blending sounds and segmenting words during the second semester. Students receiving small group interventions were taught to identify initial and final sounds (about 15 minutes per meeting during the first semester, less time during the second semester), and segmenting words and blending sounds (about 15 minutes per meeting during the second semester only). Other instruction during these small group interventions emphasized rhyming (about 5-10 minutes per meeting all year), and recognizing that sentences are made of words (about 5 minutes all year). Common activities used to teach phonological awareness and alphabetic principle skills in the small group interventions classes include the following: naming objects that rhyme, nursery rhymes, songs, playing games such as Concentration and Go Fish, making sentence puzzles, counting the number of words on a page, clapping or jumping once for each syllable found in a word, matching magnetic letters to pictures to identify initial sounds, related computer games, blending charts, Elkonian frog hops, and sounding out nonsense words using Lima beans. Activities from specific programs such as *Slap Jack Predictable Books, Processing Phonics, Phonemic Awareness and Activities, Phonemic Awareness Songs and Rhymes,* and the *McMillan Big Book Series* were often used in these small groups.

All teachers reported that the activities were modeled and that the students received guided practice in each activity. Sounds were introduced in a variety of ways; many teachers introduced continuous

sounds first (*f, n, l,* s) that matched the reading text. A couple other teachers reported introducing sounds that are of frequent use and that match the developmental stages outlined on a speech chart given to them by the speech-language pathologist. Finally, other responses indicated sounds are introduced sequentially from *a* to z or randomly. Most teachers introduced sounds with letters, although a couple indicated that they expect the students to learn the sounds before learning the letters to which each sound is associated. Most teachers also reported that they introduced whole words with fewer phonemes first. Finally, students were exposed to print through a variety of ways in all classrooms; print was viewed through charts, books, magnetic letters, and letter people.

The effectiveness of the interventions at helping students attain the May DIBELS benchmarks. Table 2 shows that the May DIBELS benchmarks were more often reached by students in the no intervention group and in the first semester intervention group than in any of the other categories. Little difference in the percentage of students attaining the May benchmark for LNF existed between the no intervention group and the first semester intervention group, as the percentages were 86.3% and 85.7% respectively. One hundred percent of the students who experienced the interventions first semester attained the PSF benchmark in May, followed by 75.5% of the students receiving no interventions and 60.0% of the students experiencing interventions second semester. Thus, students receiving interventions first semester had the most favorable performances on the May PSF measure. However, students experiencing no interventions produced higher scores on the May NWF measure, as 68.6% of the students in this group attained this

benchmark compared to 42.9% of the students in the first semester intervention group.

The students who received interventions second semester consistently produced lower scores than the students in the no intervention and in the first semester intervention groups, suggesting that early intervention is critical. However, students in the second semester group performed more favorably than the students who received interventions all year on the LNF and PSF measures; this is logical, as the students needing interventions all year are likely to be a unique group of individuals since they did not respond well to the interventions that were experienced first semester. Finally, the group with the fewest students reaching May benchmarks was the special education group. Thus, overall the May benchmarks were often met by students in the no intervention and the first semester intervention groups, followed by students in the second semester intervention group, the all year intervention group, and the special education group respectively (Table 2).

Calculations of the mean DIBELS scores (Table 3) shows that kindergarteners in the no intervention group attained higher average May DIBELS scores than kindergarteners in any of the other intervention groups on the LNF and NWF measures. However, kindergarteners in the first semester intervention group attained the highest average scores on the May PSF measures. Furthermore, when comparing performances between the groups that experienced interventions, the results show that the students in the first semester intervention group consistently experienced the highest average May scores, while the students in

special education consistently experienced the lowest average May scores.

In addition to the May data, Table 3 includes the mean DIBELS scores, standard deviations, and ranges for measures administered in September and January as a means to learn more about the students in the second semester, the all year, and the special education intervention groups. More specifically, this information is included to determine if September or January performances allow for the identification of these students early in the year. The findings demonstrate that the students identified as needing intensive instructional support in January, thus the students in the second semester intervention group, had a mean September Initial Sounds Fluency (ISF) score that was slightly lower than the mean September ISF score of the students in the first semester intervention group; however, the second semester intervention group demonstrated higher mean September LNF scores than the first semester intervention group. When comparing students in the special education group with other groups, students in this group had much lower mean September ISF and September LNF scores.

Evaluations of the mean and range of gain scores for each measure administered more than once show that interventions experienced during the first semester were effective as the students in this group had the highest average gains on the ISF measures between September and January (19.71). The highest gain on these measures was 50 points, which was experienced by a student in the no intervention group; importantly, though, this gain was closely followed by the highest gain experienced by a student in the first semester intervention group, which was a gain

of 49 points. Moreover, the lowest gain score experienced by a student in the first semester intervention group was 11 points, meaning that the student making the least amount of progress in this group increased his or her score by 11 points; this was the highest least gain score of any group.

In addition, the interventions experienced first semester were effective in increasing LNF scores from September to January. The average gain on this measure was higher for the students receiving interventions first semester than for the students in the no intervention group, as the average gains were 36.43 and 20.95 respectively. Furthermore, the student from this group making the most progress increased his or her score by 49 points, which was the highest gain score of any group (although it was closely followed by the highest gain score of a student in the no intervention group). Additionally, the student in the first semester intervention group who demonstrated the least amount of progress increased his or her score by 19 points, which is much higher than the least gain score of any other group.

Although close, the average gain scores on LNF from January to May were higher among the students experiencing interventions first semester, second semester, and all year than for students receiving no interventions. The highest average gain scores were experienced by the second semester (16.40), first semester (12.88), all year (12.33), and no (12.14) intervention groups respectively. Students receiving special education closely followed with an average gain score of 12.13. Interestingly, the student with the lowest gain score increased his or

her performance by 5 points and was a member of the special education group.

The importance of receiving interventions early was also evidenced through the average gain score on LNF from September to May, as the students in the first semester intervention group experienced the most progress, with an average gain score of 45.71. Interestingly, though, the second highest average gain score on LNF from September to May was experienced by the students receiving interventions all year (34.50). These 2 groups shared the most favorable least gain score of 23.

As with LNF, the students in the first semester, second semester, and all year intervention groups made more progress on average in PSF than did the students in the no intervention group. Students in the second semester group made the most average progress in PSF from January to May; the average gain score for this group was 33 points. While students in the second semester group experienced the highest average gains on PSF, this group was followed by the first semester, the all year, and the no intervention groups respectively. Students in special education experienced the lowest average gain in PSF. Additionally, the student from the second semester intervention group making the least amount of progress increased his or her score by 26 points, which was the highest least gain score of any group. The student making the most progress in this group increased his or her PSF score from January to May by 46 points; the overall highest gain on these measures was experienced by a student in the no intervention group, who increased his or her score by 47 points.

Overall effectiveness of this program in maximizing the number of students who reached CBM reading goals in first-grade. When combining the median number of words read correctly of the 119 students, regardless of intervention group, the median number of words read correctly in September was 8; students whose median score was 8 or above performed above the second quartile, or in other words, they read as well or better than 50% of the other students. Two students who were in the first semester intervention group as kindergarteners placed above the second quartile on the CBM reading probes in September, with median scores of 11 and 16; all of the other students who placed above the second quartile were in the no intervention group as kindergarteners (Table 5). The mean number of words per minute read correctly in September by all 119 students was 18.76, with a standard deviation of 26.54; only the students who received no interventions attained scores at or above the mean.

Similar results were found in January. The January median number of words read correctly was 31. Only 1 student from the first semester intervention group attained a median score that was above the second quartile, with a median score of 35; all other students performing above the second quartile were in the no intervention group as kindergarteners (Table 5). In addition, the mean number of words read correctly in January was 41.68, with a standard deviation of 33.16. All students performing at or above the mean were in the no intervention group as kindergarteners, except for 1 student, who was in the first semester intervention group.

Interestingly, as Table 6 shows, very few students were reading at the independent or instructional levels as first-graders in

September or January. All but 16 of the 119 students were reading at the frustrational level in September, and each of these students was in the no intervention group; therefore, every student in the intervention groups was reading at the frustrational level. Similarly, the only students reading at the independent or instructional level in January were part of the no intervention group, and only 43 students were at these levels.

Table 7 contains the mean number of words read per minute by students in each intervention group. Performances in both September and January show that the students in the no intervention group read the most words correctly on average, followed by students in the first semester, second semester, and all year intervention groups respectively; students in the special education group had the lowest mean number of words read correctly in both September and January.

Thus, the students who were in the no intervention group as kindergarteners were the most successful first-grade readers in September and January. In both September and January, 2 students in the first semester intervention group attained median CBM scores that were much higher than the other students in the intervention groups. However, besides these 2 students, in September 1 group did not consistently perform more favorably than another. In January, though, students who received interventions during the first semester or second semester read more words per minute correctly than did the students who received interventions all year or who were in special education; this is somewhat consistent with the trends found with the DIBELS measures, although more overlap exists in reading performances between the first and second semester groups than in their DIBELS performances.

Discussion

The purpose of this study was to evaluate the implementation of a feasible and teacher friendly early literacy program in place at a local elementary school. This study determined the effectiveness of kindergarten interventions aimed at increasing pre-reading skills by evaluating each student's performance on the May DIBELS measures; furthermore, this study then compared each student's DIBELS performance with his or her reading skills in September and January of the following year (thus, when the students were in first-grade).

Data from the teacher questionnaires suggest that many instructional similarities existed between the kindergarten classrooms. Importantly, students from each classroom were placed in an intervention group at some time throughout the year, providing further evidence that teacher differences within the regular education classroom did not play a role in determining a child's placement or performances.

Overall, the May DIBELS benchmarks were more likely to be attained by students who did not receive any interventions at all, thus the students who were not at risk of developing pre-reading skills at the assessment times in September or January, and by the students who experienced the interventions throughout the first semester only. Students in the no intervention group and in the first semester intervention group performed similarly on the May DIBELS measures and were the least likely students to be at-risk of not developing pre-reading skills by the end of kindergarten. This finding is reasonable, as research suggests that pre-reading skills can be taught and that early intervention is critical (Felton & Pepper, 1995; Snider, 1995;

Chard & Dickson, 1999). Students receiving interventions throughout the second semester did not perform as well on the May measures as the other 2 previously mentioned groups, however, these students were younger than the students in the other groups, which may possibly help explain this finding. Nevertheless, these students did perform more favorably than the students who received interventions all year and those who were in special education; this finding too is reasonable, as the students in need of additional assistance all year are likely to be unique individuals, as they did not respond well to the interventions during the first semester, and the students in special education had been identified as needing additional resources. Of the groups experiencing interventions, then, the students in the first semester group consistently performed the most favorably, followed by those in the second semester group, the all year group, and the special education group respectively.

Students in the no intervention group consistently exceeded the DIBELS benchmarks throughout the kindergarten year, as did the students in the first semester intervention group after the September DIBELS assessment; these 2 groups consistently had the highest average DIBELS scores. Students in the second semester intervention group exceeded only 1 DIBELS benchmark (May PSF), which was given immediately after they experienced the small group interventions, suggesting that the interventions were effective.

Through close evaluations of the September data in Table 3, it appears that the students in the second semester group might be identifiable at the start of the school year, and therefore, might benefit from receiving earlier interventions. Specifically, the

September mean ISF score of these students was 5.67, which was only slightly lower than the mean score of the students experiencing interventions first semester. In the future, students scoring low on the September ISF measures should maybe be included in the intervention group right away, despite their LNF score (since the students in the second semester intervention group were less identifiable through their September LNF performances). Likewise, students in the all year intervention group had a much lower mean September ISF score than any of the other groups, suggesting that these students should maybe receive different or even more intense interventions at the beginning of the school year.

Finally, support for the effectiveness of the interventions is provided through analyzing the students' performance gains in measures across time. Students in the first semester group clearly made the most gains in all areas across time from September to January and from September to May. Students in this group made more progress than students in the no intervention group across all measures. Critically, students in the first semester group experienced more progress than any other group immediately following their small group interventions on the September to January assessments of ISF and LNF, just as the second semester group experienced the highest average gain immediately following their small group interventions on the LNF and PSF measures from January to May. However, when looking at the average gain score in LNF from September to May, students in the first semester group made the most progress, providing further evidence of the importance of early intervention (Felton & Pepper, 1995; Snider, 1995; Chard & Dickson, 1999). Nevertheless, though, these findings highlight the

effectiveness of the interventions whether they were received first or second semester, as the students in these 2 groups consistently experienced the most progress over time. Additionally, the average gain in performance on the LNF and PSF measures from January to May was highest for students who experienced any intervention (first semester, second semester, or all year) than for students not receiving any interventions at all, suggesting that the interventions were effective.

While the DIBELS data suggest the interventions, particularly when experienced first semester in kindergarten, were effective at helping students attain the skills needed to be a successful reader, the CBM data show that the students who were not at-risk of developing these pre-reading skills at any time throughout the kindergarten year were still the most successful readers in first-grade. Thus, the students identified by the DIBELS in kindergarten as being at-risk for struggling with reading did tend to be less fluent readers as first-graders in September and January. Interestingly, though, no pattern among intervention groups existed when examining the CBM performances in September; the performances among these groups overlapped. However, in January, the students who received interventions during the first or second semester in kindergarten tended to read more words per minute than the students who experienced the interventions all year or those who were in special education. Finally, when examining accuracy rates in first-grade, very few students were reading at the independent or instructional level, suggesting that more practice with reading may be needed before accuracy rates provide useful information.

Limitations

Importantly, though, the intervention groups consisted of a small sample size compared to the no intervention group; therefore, care must be taken when interpreting these results. Other factors that may have influenced the results are the students' motivational levels and the amount of home support they received. Without considering these factors, the findings of this study support current research that suggests pre-reading skills can be taught, early intervention is critical (Baker & Kame'enui, 1994; Kame'enui et al., 2001; Byrne & Fielding-Barnsley, 1995; Coyne et al., 2001; *DIBELS*, 2001; Felton & Pepper, 1995; Reutzel, 1992; Schneider et al., 1999), and that the DIBELS provides a fairly reliable measure of pre-reading skills and predicts later reading ability (*DIBELS*, Kaminski & Good III, 1996; Kaminski & Good III, 1998).

Future Research

Early literacy programs using the DIBELS and CBM measures would benefit from future studies examining the effectiveness of pre-reading interventions that differ from the interventions experienced in this study. For example, interventions that are of greater length should be examined to determine whether or not similar interventions that are provided in longer sessions are more effective than those interventions experienced in this study. Other variations of intervention sessions could include smaller group sizes.

Furthermore, specific DIBELS measures, such as the NWF measures, and their correlation with reading performances in later grades should be examined to determine if certain DIBELS measures are more predictive of later reading ability than other measures. Other contributing

factors that research should address include the motivational levels of students and the amount of home support received.

Future research also needs to replicate this study's findings regarding the relationship between students' September ISF performances and their level of need in January. Specifically, research is needed to determine if providing early interventions to students who are not at the intensive instructional support level in September, but who have low September ISF scores, will minimize the number of these students who are needing intensive instructional support in January; similarly, studies in which students who have the lowest September ISF scores are provided with more intensive interventions (i.e., smaller groups, daily sessions, lengthier sessions) need to be conducted to determine if the number of these students who are performing at the intensive instructional support level in January can be reduced.

Conclusions

In summary, the DIBELS measures show that the interventions provided in kindergarten were effective, particularly when experienced first semester. Students identified as needing interventions later in the year or all year long seem to be identifiable in September by performances on ISF measures; school personnel are recommended to identify these students early so that appropriate interventions can be experienced immediately. In addition, the DIBELS measures administered in May predicted that some students from the first and second semester intervention groups would develop into successful readers.

Performances on CBM reading probes show that some of the students in the first semester intervention group did meet their reading goals in first-grade (2 in September and 1 in January). Critically, only 2

students from any of the intervention groups surpassed the benchmarks on all 3 May DIBELS measures; these 2 students were in the first semester intervention group. Both of these students met their reading goals in first-grade; 1 attained the reading goal in September, and 1 in January. The other first-grader who met the reading goal in September surpassed 2 of the 3 (LNF and PSF) May DIBELS benchmarks. Critically, when these 3 particular students did not meet their reading goals in first-grade, they only missed attaining their goals by a couple words per minute, meaning that they were reading extremely close to their goals.

These findings suggest the DIBELS can predict later reading abilities. Furthermore, most of the students who were identified as needing interventions in kindergarten did not reach their first-grade reading goals, further suggesting that the DIBELS is a fairly reliable predictor of later reading abilities.

Finally, this study demonstrates the feasibility of implementing an effective school-wide early literacy program. The current study, along with previous research (*DIBELS*, 2001; Kaminski & Good III, 1996; Kaminski & Good III, 1998; Good III et al., 2002), suggests that the DIBELS does measure the development of pre-reading skills, and that DIBELS measures can be used to effectively and easily guide a school-wide early literacy program. Furthermore, this study has demonstrated how CBM reading probes can be easily administered to a large number of students within a school building, and how students' performances on DIBELS measures are related to their performances on CBM reading probes.

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Table 1

Demographic Information of Student Participants in Kindergarten

	Intervention				
	None	First Semester	Second Semester	All Year	Special Ed.	n
Gender						
Male	46	3	3	4	4	60
Female	56	4	2	2	4	68
Ethnicity						
Caucasian	99	7	5	6	8	125
Hispanic	1	0	0	0	0	1
Asian	1	0	0	0	0	1
Native American	1	0	0	0	0	1
Previously Retained	2	0	0	0	2	4
n	102	7	5	6	8	128
Average Age in Sept	5:8	5:8	5:4	5:7	5:11	-

Table 2

Number of Students Reaching May DIBELS Benchmarks by Intervention

Intervention	LNF	PSF	NWF	Sample Size
None	88 (86.3%)	77 (75.5%)	70 (68.6%)	102
First Semester	6 (85.7%)	7 (100.0%)	3 (42.9%)	7
Second Semester	2 (40.0%)	3 (60.0%)	0 (0.0%)	5
All Year	2 (33.3%)	2 (33.3%)	1 (16.7%)	6
Special Education	1 (11.1%)	2 (25.0%)	0 (0.0%)	8

*May LNF benchmark = 40
*May PSF benchmark = 35
*May NWF benchmark = 25

Table 3

Mean DIBELS Scores, Standard Deviations, and Score Ranges by Intervention

	Initial Sounds		Letter Naming			Phoneme Segmentation		Nonsense Word
Intervention	September	January	September	January	May	January	May	May
None								
Mean	14.24	26.04	20.91	41.86	54.00	34.61	42.61	37.57
SD	8.38	11.60	14.02	12.15	13.36	17.01	11.57	21.23
Range	0-36	5-64	2-63	16-75	20-94	0-75	14-66	7-138
First Semester								
Mean	6.00	31.57	1.57	38.00	47.29	26.43	46.86	22.57
SD	1.73	13.94	0.98	8.98	12.57	9.25	6.47	12.84
Range	3-8	16-56	0-3	21-50	25-63	10-36	37-58	5-46
Second Semester								
Mean	5.67	8.40	6.67	15.60	32.00	2.20	35.20	13.40
SD	9.81	5.41	2.89	8.26	10.61	3.49	7.19	7.60
Range	0-17	0-13	5-10	8-26	22-46	0-8	26-46	8-24
All Year								
Mean	2.50	11.67	2.67	24.83	37.17	8.50	20.33	14.83
SD	2.95	8.38	5.57	10.03	11.07	10.88	18.23	6.82
Range	0-6	3-23	0-14	12-40	24-51	0-28	0-44	10-25
Special Education								
Mean	6.25	10.88	6.25	17.00	29.13	7.50	14.75	9.75
SD	4.68	7.14	6.69	11.64	13.85	11.74	17.53	5.09
Range	0-13	0-24	0-17	3-42	11-53	0-32	0-41	0-14
Benchmark	8	8	25	27	40	18	35	25

*No Intervention Group September n = 100, January n = 102, May n = 102

Table 4

Mean Gains, Standard Deviations, and Gain Ranges by Intervention

	Initial Sounds Fluency		Letter Naming Fluency		Phoneme Segmentation Fluency
Intervention	Sept-Jan	Sept-Jan	Jan-May	Sept-May	Jan-May
None					
Mean	11.80	20.95	12.14	33.09	8.01
SD	12.54	11.68	10.66	13.14	15.36
Range	-15-50	-10-48	-9-38	-12-72	-34-47
First Semester					
Mean	19.71	36.43	12.88	45.71	20.43
SD	13.78	9.34	12.50	12.59	6.95
Range	11-49	19-49	2-22	23-61	14-35
Second Semester					
Mean	6.33	13.33	16.40	29.33	33.00
SD	8.96	7.51	10.99	15.31	7.97
Range	-4-12	6-21	-1-29	12-41	26-46
All Year					
Mean	9.17	22.17	12.33	34.50	11.33
SD	6.31	12.21	12.37	9.63	11.39
Range	3-20	7-39	-3-28	23-36	-6-24
Special Education					
Mean	4.63	10.75	12.13	22.88	7.25
SD	5.26	9.84	5.82	12.21	12.37
Range	-6-11	-1-32	5-24	11-43	-1-30

No Intervention Group:
*September-January n = 100
*January-May n = 102
*September-May n = 100

Table 5

Number of First-Grade Students Reading in the First, Second, Third, and Fourth Quartiles by Intervention

Intervention	September	January
None		
First Quartile	14	15
Second Quartile	25	27
Third Quartile	28	29
Fourth Quartile	29	29
First Semester		
First Quartile	3	3
Second Quartile	2	3
Third Quartile	2	1
Fourth Quartile	0	0
Second Semester		
First Quartile	4	2
Second Quartile	0	2
Third Quartile	0	0
Fourth Quartile	0	0
All Year		
First Quartile	4	5
Second Quartile	1	0
Third Quartile	0	0
Fourth Quartile	0	0
Special Education		
First Quartile	5	5
Second Quartile	0	0
Third Quartile	0	0
Fourth Quartile	0	0

Table 6

Number of First-Grade Students Reading at Independent, Instructional, and Frustrational Levels by Intervention

Intervention	September	January
None		
Independent	10	33
Instructional	6	10
Frustrational	82	55
n	98	98
First Semester		
Independent	0	0
Instructional	0	0
Frustrational	7	7
n	7	7
Second Semester		
Independent	0	0
Instructional	0	0
Frustrational	4	4
n	4	4
All Year		
Independent	0	0
Instructional	0	0
Frustrational	5	5
n	5	5
Special Education		
Independent	0	0
Instructional	0	0
Frustrational	5	5
n	5	5

Table 7

Mean Words Per Minute (WPM)
Read by First-Graders by Intervention

Intervention	September	January
None		
Mean	22.03	47.66
SD	28.16	33.33
Range	1-135	5-176
n	98	98
First Semester		
Mean	6.14	19.86
SD	5.34	12.54
Range	1-16	3-35
n	7	7
Second Semester		
Mean	2.50	18.00
SD	0.58	9.63
Range	2-3	7-30
n	4	4
All Year		
Mean	2.40	10.80
SD	2.19	4.15
Range	0-6	4-15
n	5	5
Special Education		
Mean	1.80	4.80
SD	1.64	2.59
Range	0-3	2-8
n	5	

Appendix

PLEASE *CIRCLE* THE TWO APPROPRIATE CHOICES AND *IF POSSIBLE*, ESTIMATE THE TIME SPENT ON RELATED ACTIVITIES.

1. a. How often do you incorporate rhyming into your classroom?

→Throughout the day (estimated time/day____)
once a day (estimated time/day____)
twice a week (estimated time/week____)
once a week (estimated time/week____)
Less than once a week (estimated time _____)

→all year beginning of year
other:_____

b. Please specify the types of activities used to teach rhyming.

_____
_____
_____

2. a. How often do you discuss that sentences are made of words?

→Throughout the day (estimated time/day____)
once a day (estimated time/day____)
twice a week (estimated time/week____)
once a week (estimated time/week____)
Less than once a week (estimated time _____)

→all year beginning of year
other:_____

b. Please specify the types of activities used to teach that sentences are made of words.

_____
_____
_____

3. a. How often do you incorporate the awareness of syllables in your classroom?

→Throughout the day (estimated time/day____)
once a day (estimated time/day____)
twice a week (estimated time/week____)
once a week (estimated time/week____)
Less than once a week (estimated time _____)

→all year beginning of year
other:_____

b. Please specify the types of activities used to teach the awareness of syllables.

_____
_____
_____

4. a. How often do you incorporate identifying initial and final sounds in your classroom?

→Throughout the day (estimated time/day____)
once a day (estimated time/day____)
twice a week (estimated time/week____)
once a week (estimated time/week____)
Less than once a week (estimated time _____)

→all year beginning of year
other:_____

b. Please specify the types of activities used to identify initial and final sounds.

_____
_____
_____

5. a. How often do you incorporate the understanding of phonemes?

→Throughout the day (estimated time/day____)
once a day (estimated time/day____)
twice a week (estimated time/week____)
once a week (estimated time/week____)
Less than once a week (estimated time _____)

→all year beginning of year
other:_____

b. Please specify the types of activities used to understand phonemes.

_____
_____
_____

6. a. How often do you incorporate segmenting words in your classroom?

→Throughout the day (estimated time/day____)
once a day (estimated time/day____)
twice a week (estimated time/week____)
once a week (estimated time/week____)
Less than once a week (estimated time _____)

→all year beginning of year
other:_____

b. Please specify the types of activities used to teach segmenting words.

_____
_____
_____

7. a. How often do you incorporate blending phonemes in your classroom?

→Throughout the day (estimated time/day____)
once a day (estimated time/day____)
twice a week (estimated time/week____)
once a week (estimated time/week____)
Less than once a week (estimated time _____)

→all year beginning of year
other:_____

b. Please specify the types of activities used to teach blending phonemes.

_____
_____
_____

8. If you use any specific programs, please circle them below or write in the programs that you use.

Sounds Abounds Phonemic Awareness Songs & Rhymes Dr. Jean

Phonemic Awareness in Young Children

Other (please list):

_____
_____
_____
_____

9. Do the students who receive small group instruction still receive interventions in your classroom?

Yes No

If so, do they get the same amount of interventions as the rest of the students in your classroom?

Yes No

If no, please explain.

_____

_____

10. Are the phonological awareness activities modeled?

Yes No

11. Do students receive guided practice in phonological awareness activities?

Yes No

If yes, how often?

_____

12. In general, how are words first introduced?

syllables first whole words first

whole words with fewer phonemes first

other:_____

13. When introducing sounds, how are the sounds chosen?

randomly continuous sounds first (*f, n, l, s*)

stop sounds first (*b, d, k, p*) to match reading text

14. Please circle one of the following statements:

Sounds are taught before introducing letters.

Sounds are introduced with the letters.

15. In what ways are the students exposed to print in your classroom? Please circle all that apply.

charts books magnetic letters

letter people

Other:_____

_____

16. How do you think the small group interventions differed from the general classroom interventions?

17. Please estimate the amount of time *per week* the selected students in your classroom experienced small group interventions.

18. Please list anything else you can tell me that I might have missed in the questions above.

THANK YOU!