

Interactive Whiteboard Technology and Phonemic

Awareness Skills of Emergent Readers:

A Literature Review

by

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A Research Paper

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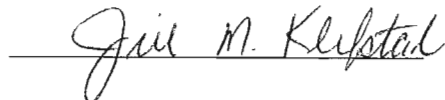
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ABSTRACT

Emergent readers are exposed to phonemic awareness very early in their education. There are many different methods that early childhood educators use to help students become phonetically aware. A current educational trend is to use technology as an instructional tool to support emergent readers in becoming phonetically aware. Technology has been found to be motivating to students and can increase student engagement. However, in order to understand the direct effect technology has on phonemic awareness development in emergent readers, a review of the current literature was examined. Specifically, the review includes research on: how phonemic awareness is taught and learned, how phonemic awareness helps students learn to read and write, how phonemic awareness instruction helps students learn to spell, and how technology can be used to provide phonemic awareness instruction.

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Chapter I: Introduction

“The genie is out of the bottle; technology is here to stay. Young children live in a world of interactive media and they are growing up at ease with digital devices that may still puzzle their parents and grandparents” (NAEYC, 2011, p. 2). Technology affects several aspects of our students’ lives. Because most students are comfortable using technology it makes sense to capitalize on their abilities during instructional times. Educational technology is defined by Roberts (2008) as tools designed to enhance the learning experience. These technologies can be applied to many different lessons and activities. Some of the benefits of using educational technology include: instantly showing video clips to explain confusing concepts, creating digital flipcharts on an interactive whiteboard, saving notes for future use, and making quick and seamless revisions to activities or lessons (Hall & Higgins, 2005, p. 104). In addition to providing access to a wider range of resources the use of technology can also increase student interaction and engagement. Student engagement during a lesson refers to how willing a student is to participate in the activity. The amount of engagement increases when students are interested in the material and captivated by the method in which content is presented (Beeland, 2002).

Students become engaged during a lesson on the interactive whiteboard because of the visual stimulation it provides. The amount a student is engaged during a lesson has also been connected to the frequency of text, graphics, video, and sound that is used during the lessons (Beeland, 2002).

Perhaps the greatest benefit to students using an interactive whiteboard is the interactivity it provides. Lessons and activities created on an interactive whiteboard are designed with direct participation in mind. In a study conducted by Martin (2007) it was found that students with a range of abilities participated in large-group lesson using the interactive whiteboard. It was also

noted that student interaction seemed to decrease the further distance the students were positioned from the board. The closer students are to the board the more engaged in the lesson they become. Engaging lessons and activities on the interactive whiteboard can occur across the curriculum and especially during phonemic awareness instruction.

Phonemic awareness refers to the awareness that the speech stream consists of a sequence of sounds-specifically phonemes. Phonemes are defined as the smallest unit of sound that makes a difference in communication (Yopp & Yopp, 2000). Some studies have suggested that when students understand phonemic awareness and are able to apply it, they will be able to read (Morris, Bloodgood, & Perney, 2003, p. 94). In fact, phonemic awareness has been directly linked to reading success (Lane, Pullen, Eisele, & Jordan, 2002, p. 101).

The development of phonemic awareness occurs in a specific, sequential way. Ehri, Nunes, Willows, Schuster, Yaghoub-Zadeh & Shanahan (2001) presented an explanation of the development of phonemic awareness. The study found that comparing words with the same initial sound was the most basic task and blending words was the most complicated task. Once emergent learners have reached the last stage in this development they will be ready for more advanced reading and writing instruction. Without the basic skills of phonemic awareness students will be unable to decode words and comprehend texts in later grades (Berg & Stegelman, 2003, p. 48).

Lessons and activities that focus on phonemic awareness development can be incorporated using technology as a tool and have the ability to enhance student engagement. Creating interactive lessons on interactive whiteboards can also integrate the use of multiple senses simultaneously. Solvie (2004) found that students were more involved in the lesson when they were prompted to use two senses in language and literacy lessons.

Statement of Problem

Educational times are changing. Students need to be exposed to or provided with opportunities to the various forms of educational technology available. Solvie (2004) stated that teachers of emergent learners must continue to be cognizant of the need to vary activities, use authentic reading and writing materials and experiences, and incorporate movement and change of location.

Developing phonemic awareness in emergent learners is an essential piece necessary to build a solid literacy education. Griffith and Olson (2001) suggested that if students are able to gain a strong understanding of phonemic awareness, they will become more aware of the basic sounds of speech. Edelen-Smith (1997) emphasized that early training in phonemic awareness should be a priority in the classroom to help improve early reading instruction and reduce reading failures.

Purpose of the Study

The purpose of this review is to examine the effect that the use of an interactive whiteboard has on emergent learners' understanding of phonemic awareness.

Research Questions

The following questions guided this literature review:

1. How do emergent readers learn phonemic awareness?
2. What are some current instructional methods used to teach phonemic awareness skills to emergent readers?
3. Can the use of interactive whiteboard technology during instructional times increase the level of students' phonemic awareness?

Definition of Terms

For clarity and understanding, the following terms are defined:

Interactive Whiteboard (IWB): A large, touch-sensitive board, which control a computer connected to a digital projector (Smith, Higgins, Wall, & Miller, 2005).

National Education for the Education of Young Children (NAEYC): The world's largest organization working on behalf of young children with nearly 80,000 members, a national network of more than 300 state and local Affiliates, and a growing global alliance of like-minded organizations (2011).

Phoneme: Is the smallest part of spoken language that makes a difference in the meaning of words (National Institute of Literacy, 2001).

Phoneme Blending: Combining individual phonemes to form words.

Phoneme Segmentation: Breaking words into individual phonemes.

Phonemic Awareness: The awareness that the speech stream consists of a sequence of sounds-specifically phonemes, the smallest unit of sound that makes a difference in communication (Yopp & Yopp, 2000).

Chapter II: Review of Literature

Introduction

The following chapter reviews the current literature around the instructional methods used to teach emergent learners phonemic awareness. Three main conclusions about emergent readers have been found that indicate a need for students to receive phonemic awareness instruction and include: 1) phonemic awareness can be taught and learned, 2) phonemic awareness helps students learn to read and write, and 3) phonemic awareness instruction helps students learn to spell.

Phonemic Awareness Can Be Taught and Learned

The National Institute for Literacy (2001) stated that phonemic awareness instruction teaches students to notice, think about, and manipulate sounds in spoken language. Research suggests that phonemic awareness skills can and should be developed prior to school in an informal way (Woods, 2003). Not only is phonemic awareness a predictor of future reading success, it also has been found to be completely necessary for students who are learning to read. When the instruction is teacher-led and specific, emergent learners have a greater tendency to increase their phonemic awareness (Hecht & Close, 2002). As a result, students need instruction that is appropriate for their level of phonemic awareness. Several different skills encompass phonemic awareness and should be targeted during instructional times. Three of the skills were consistently addressed in research. The skills are 1) phoneme isolation, 2) phoneme segmentation, and 3) phoneme blending.

Phoneme isolation. The National Institute for Literacy (2001) stated that when students are able to recognize individual phonemes, or sounds, in a given word they are demonstrating phoneme segmentation. The most common phoneme that students can hear is the initial, or first,

phoneme. Morris, Bloodgood, Lomax, & Perney (2003) offered sequential data that illustrates the developmental process in phoneme isolation. They found that students first become aware of the initial consonant sound; next, the initial and final consonant sound; and finally, the vowel sound between the initial and final consonant (see Table 1). Students who can identify even one phoneme in a word showed a greater ability to complete more complex phonemic awareness tasks (Carroll, 2004). Since phoneme isolation is considered to be a basic skill that helps prepare students for more complicated tasks it is important that educators prepare appropriate lessons that target this skill.

Table 1

Development of Phoneme Isolation with the Word “bat”

Word	Student Response	Level
bat	/b/	Beginning
bat	/b/-/t/	Intermediate
bat	/b/-/a/-t/	Advanced

There are many instructional methods that educators can use to help students understand and apply phoneme isolation. Although it is appropriate to plan activities to help support phoneme isolation, it is also crucial to implement unplanned, extension activities after reading a story or saying a poem. Edelen-Smith (1997) suggested that specific words should be targeted from stories, poems, thematic units, or discussions that occurred in the classroom. Yopp (1992) offered various suggested activities to help assist students in mastering the skill of phoneme isolation. One example includes students given a word and asked to verbally identify the initial, middle, or final phoneme. Activities that require students to identify an individual phoneme in a

word can be modified to meet individual students at their instructional level. Specifically, if a student has not mastered initial phonemes asking them to identify the initial sound in the word “bat” would be appropriate. In the same way, if a student has mastered the skill of identifying initial phonemes asking them to identify the middle or final phoneme in the word “bat” would be appropriate.

Once students are able to hear all of the separate phonemes in a given word they are developmentally ready to progress to the next stage of phonemic awareness instruction, phoneme segmentation.

Phoneme segmentation. Phoneme segmentation is demonstrated when students are given a word and try to verbally divide the word into its smallest parts (Manning, 2005). Students who are able to segment words should also be able to write and read the word as they break it apart into the smaller phonemes. Woods (2003) offered a suggestion for teaching phoneme segmentation that included a kinesthetic approach to help students become comfortable with this skill. The student says a familiar word and breaks it apart into individual phonemes. The activity becomes kinesthetic when a specific finger is assigned to each phoneme. When the phoneme is vocalized the student taps his/her fingers on a table or knee to help associate each phoneme with the movement.

Since phonemic segmentation is a developmental process, Manning (2005) suggests that students demonstrate phoneme segmentation in four different levels. The first level includes no segmentation of the word but rather the student repeats the word they heard. The second level requires students to separate the word by syllables. At the third level a student will divide one of the syllables into segments. The fourth level is achieved when all of the phonemes in the word are segmented (see Table 2). Being able to identify the exact developmental level in which a

student is segmenting words assists educators in tailoring and monitoring the progress and success of the each individual student.

Table 2

Segmentation Levels of the Word “pony”

Developmental Level	Student Response	Description
Level I	/pony/	No segmentation
Level II	/po/-/ny	Words are separated by syllables
Level III	/p/-/o/-/ny/ or /po/-/n/-/y/	One syllable divided into segments
Level IV	/p/-/o/-/n/-/y/	All phonemes segmented

Students who are able to demonstrate proficiency in phoneme segmentation are ready to proceed to the next phonemic awareness skill, phoneme blending.

Phoneme blending. This sound-blending task is the opposite of phoneme segmentation. A word is given to the student by pronouncing the individual phonemes in isolation and asking the student to blend the phonemes back together to form the original word (Torgesen, 1998). When students are asked to perform this phonemic awareness skill there are three possible responses they can give (see Table 3).

Table 3

Types of Phoneme Blending of the Word “cat”

Word Given	Student Response
/k/-/a/-/t/	c
/k/-/a/-/t/	ca
/k/-/a/-/t/	cat

Cassady and Smith (2004) found that many students were able to demonstrate mastery of blending C-V-C (consonant-vowel-consonant) words at the end of kindergarten while few students needed continued instruction into first grade. In addition, Yeh and Connell (2008) concluded that students not able to blend phonemes when they enter first grade had a greater tendency to be poor readers in fourth grade.

Phoneme blending is part of a sequential process that assists emergent learners to read familiar words and commit them to memory. According to Morris, Bloodgood, Lomax, & Perney (2003) blending individual letter sounds and making words is the most basic skill when learning to read decodable words. Once the C-V-C words are practiced and eventually mastered they are easily recognized within texts.

The task of helping emergent readers understand phonemic awareness is not an easy one. Educators need to take several factors into consideration when planning phonemic awareness instruction. First, instruction should be appropriate for each individual student. Second, instruction should be deliberate and purposeful. Finally, phonemic awareness instruction should be part of an overall literacy program that is rich with other foundations of emerging literacy.

Since the skill of phoneme blending can be mastered by kindergarten students and is necessary for future reading success, it is vital for educators to reinforce this skill during kindergarten literacy instructional times.

Methods used to teach phonemic awareness with emergent learners. Educators of early childhood students have a vital role in the development of phonemic awareness skills that can be delivered using a variety of methods. Implementing phonemic awareness activities is accomplished through a variety of activities, strategies, and methods. Activities can be both

planned and spontaneous and can occur at any point in the school day. Since language development with emergent learners is essential, research has indicated a relationship between strong oral language skills and later success with written language (Woods, 2003). If students begin school with poor language skills they will inevitably struggle with developing the skills needed to read.

Yopp (1992) provides two essential steps for educators to keep in mind when preparing lessons for students to target phonemic awareness skills. The first step is to identify the specific task on which to focus for the students. The second step is to consider a developmentally appropriate activity that will engage the students. Some of the methods that can be implemented with emergent learners include: the use of songs and music, fingerplays, literature and stories, and through the use of technology.

Songs and music. The ability to hear and identify patterns within music has been found to help students hear and identify phonemes in words. Music should be an important, everyday occurrence in any early childhood classroom. Many significant and basic reading readiness skills can be learned while singing and playing music. Songs used in early childhood classrooms contain a wide variety of phonemic awareness skills which students easily identify with. Woods (2003) stated that it is appropriate to sing songs with students that are rich with rhymes, letter sounds, and provides opportunities for sound substitution, all which support phonemic awareness. A great example of a song that encompasses the use of rhyming and sound substitution is a song by recording artist, Raffi (1976), entitled *Willoughby Wallaby Woo*. The lyrics are predictable and teach children how to differentiate and substitute initial phonemes in words:

Willoughby wallaby wee, an elephant sat on me,

Willoughby wallaby woo, an elephant sat on you,
Willoughby wallaby Wustin, an elephant sat on Justin,
Willoughby wallaby Wania, an elephant sat on Tania.

Lucas & Gromko (2005) found that when music instruction is incorporated into the curriculum students build useful discrimination skills they can apply when performing phonemic awareness tasks. Singing repetitive songs demonstrates how students can hear patterns and sound discrimination skills in the spoken word and how they can benefit from music when incorporated into phonemic instruction. In another study, Gromko (2005) found that kindergarten students who receive music instruction showed greater gains in developing phoneme segmentation skills when compared with students that received no music instruction.

When singing songs that support phonemic awareness development with young students it is not necessary to only use songs by recording artists. Altering the words to popular songs for emergent learners is also an appropriate strategy to use when incorporating phonemic awareness into songs. Yopp (1992) suggests that these variations or substitutions can be as basic as changing the beginning sound of some of the words. For instance, when using the song “Old MacDonald Had a Farm” students can easily and successfully substitute sounds to help them hear other sounds. In other words, if students are singing “Ee-igh, ee-igh, oh” they could replace it with “Bee-bigh, bee-bigh, boh” when working on the phoneme /b/.

Lane, Pullen, Eisele, and Jordan (2002) suggest that songs can be embedded with phoneme awareness skills for emerging learners. Altering the words to “Twinkle, Twinkle, Little Star” creates a new song whereby students can segment words into the separate phonemes. For instance, if the students are practicing phoneme segmentation with the word ‘cat’ the teacher can sing:

Listen, listen to my word,
Tell me all the sounds you heard: *cat*
/c/ is one sound,
/a/ is two,
/t/ is the last in *cat*, it's true.
Thanks for listening to my word,
And telling me the sounds you heard.

Along with using songs and music to help emergent learners develop phonemic awareness skills, the use of finger plays can also strengthen these skills.

Fingerplays. Knowing that phonological skills develop in a certain developmental order, the use of finger plays in early childhood classrooms play a very important role in fostering this skill. Fingerplays help develop vocabulary, reinforce the ability to hear rhyming words, and nurture students' awareness of beginning phonemes. Arnold & Colburn (2005) stated that fingerplays are not only critical in the development of phonemic awareness but also help emergent learners associate words with meaning. For example, any fingerplay that has the student hold up ten fingers helps the student to understand the value of the number ten.

The most popular fingerplay used to help reinforce phonemic awareness is entitled "A-Hunting We Will Go". Many skills can be assessed from these lyrics thus benefiting all students in the class:

A-hunting we will go,
A-hunting we will go,
We'll catch fox,
And put him in a box,

And then we'll let him go.

In the example provided, the rhyming words are *box* and *fox*. Those words can be changed to help students continue to reinforce rhyming words. For those students who are ready for more advanced phonological skills, they can identify initial phonemes they heard from the song. When students are demonstrating proficiency with initial phonemes they may be ready to segment words from the song.

Exposing emergent learners to different types of phonemic awareness activities can be done at any point during the school day. Another activity that can reinforce phonemic awareness is through the use of literature and stories.

Literature and stories. Reading stories to emergent learners can help them hear sounds in words and begin to understand the spoken language. There are thousands of stories that are appropriate for emergent learners so teachers should try to select stories that contain rhyming, alliteration, and varied manipulation of phonemes (Griffith & Olson, 1992). Providing supportive conversations before, during, and after the story to identify the rhyming words or words that start with the same phoneme are ways to promote phonemic awareness. Since students need to be able to hear the different phonemes in words before they can start to produce or read them, reading stories is a natural way to develop phonemic awareness (Zeece, 2006). When students are developmentally ready they will be able to sound out unfamiliar words they encounter in a text. Jenkins, Vadasy, Peyton, & Sanders (2003) concluded that all students can benefit from the use of decodable texts when they have had practice with letter-sound correspondence. Decodable texts are texts that incorporate a large amount of high-frequency words and encourage phoneme segmentation. Any attempt to expose early learners to phonemes should occur several times each day and can be presented with little effort.

Technology. Technology continues to be the fastest growing trend in education. Many students have access to technology that supports their learning in all curricular areas. Rasinski & Padak (2008) found that the computer, internet, and other forms of educational technology have become a part of many students' everyday lives. Computers, by nature, allow the user to physically complete any given task. Collins & Halverson (2010) stated that using computers help align students with a 'learning by doing' method as opposed to a 'learning by listening' or 'learning by reading' method. Students benefit most when technology is used as a tool in delivering information in an interactive manner. Smith, Higgins, Wall, & Miller (2005) offered some clarification as to how a lesson can be interactive. When students are physically manipulating texts and other images on the screen they are interacting with it. Interactive technologies naturally foster a more hands-on approach to education. NAEYC (2011) stated that effective uses of technology and screen media are active, hands-on, engaging, and should be used as one of many tools to support learning.

One of the most recent education trends is the use of interactive whiteboard, or IWB, technology in classrooms. An interactive whiteboard is a large, touch-sensitive board, which controls a computer connected to a digital projector (Smith, Higgins, Wall, & Miller, 2005). One of the many benefits of using this technology is that the student receives the instructional message in two ways – as words and as pictures. Combining both words and pictures with emergent learners fosters deeper understanding of the material being presented (Mayer, 2003).

Technology is constantly changing thus creating endless uses for education. NAEYC (2011) stated that the new technological tools, such as IWB technology, are changing the way students acquire knowledge and how we communicate with one another. Using IWB technology with students is a way to motivate and engage students in a lesson or activity. A study conducted

by Beeland (2002) concluded that the use of IWB technology in the classroom does lead to increased student engagement. When students are more engaged during lessons there is fewer behavior issues, student attitudes are more positive, and less time is taken away from instruction. In a similar study to gauge student engagement, Smith, Higgins, Wall, & Miller (2005) reported that pupils' zest for learning was enhanced by the surprise factor and the unknown that IWB technology brings to lessons. The multi-sensory approach that IWB technology offers can meet the many needs of the emergent learner. Solvie (2004) shared her experience with an IWB activity by stating the board allowed for the use of multiple senses which led to a higher level of engagement and greater understanding of the concepts.

When teaching phonemic awareness, providing both pictures and words benefits students who require a verbal mode of instruction and a visual mode of instruction. Another benefit of instruction with the IWB is that teachers can easily modify the images and text to accommodate the student at the board. Solvie (2004) found that it was possible for teachers to re-arrange and re-create text and other objects quickly while still communicating with the students.

The following examples of phonemic awareness activities were created on ActivInspire® software for the Promethean® IWB. The first activity is targeted for students that need practice with rhyming (see Figure 1).

Figure 1

IWB Activity for Rhyming



In this rhyming activity the students would be asked to identify the pictures orally. They would then need to decide which two pictures rhyme and demonstrate their answer by circling them.

The next example is targeted for students who need reinforcement on phoneme isolation (see Figure 2). The pictures on the screen were added in a few seconds and a teacher can easily complete that task in a matter of seconds without leaving the whiteboard.

Figure 2

IWB Magnet Letters Activity for Phoneme Isolation



In this phoneme isolation activity the students are asked to identify all three of the pictures on the screen and name the initial phoneme for each. When students have identified the phoneme they move the corresponding letter under the picture.

The last activity is targeted for students that are ready for higher-level phonemic awareness instruction and can independently segment phonemes with C-V-C words (see Figure 3).

Figure 3

IWB Magnet Letters Activity for Phoneme Segmentation



In this activity students who are developmentally ready to segment words come up to the board and name the picture, in this example it is *cat*. The student then manipulates the phonemes at the bottom of the screen to segment the word *cat* just as they would with traditional magnetic letters.

Although technology is exciting and very motivating to emergent learners it is important to use the technology as a tool to enhance students' learning and development (NAEYC, 2011). Teachers need to continue to provide students with an equal amount of time for activities that do not incorporate technology such as initial sound sorting activities with picture cards.

Duration of Phonemic Awareness Instruction. Berg & Stegelman (2003) found that spending too much time on phonemic awareness activities should be discouraged as other, equally important, language skills need to develop. Early childhood educators are aware of their students' needs and understand that phonemic awareness is a developmental process. It is essential, therefore, to ensure that students are developmentally ready to receive phonemic awareness instruction at school. Edelen-Smith (1997) stated that phonemic awareness activities should be no longer than 15-20 minutes in duration and be a natural occurrence in the classroom. The amount of instruction will be different for every student in a classroom when working one-on-one or in small groups. Unfortunately, time is very limited in classrooms and does not allow for individualized instruction all of the time. As a result, the quality of the instruction in the given time is essential. Many factors need to be considered when planning a phonemic awareness activity.

The most important consideration is the age of the students. It would be developmentally inappropriate to plan a lesson for five year old students that last longer than ten minutes. Reading & Van Deuren (2007) found that phonemic awareness instruction should be short in duration as their studies found no substantial gain found when the instruction lasted longer than ten minutes. Instruction can occur at a planned time in the day or spontaneously after a book is read; a poem is recited, or after a list of words is read.

A common occurrence in many schools is to offer additional phonemic awareness instruction as an intervention for students that have been identified as not making sufficient, grade appropriate progress. As stated by Ukrainetz, Ross, & Harm (2009), students with inadequate phonemic awareness skills often have long-lasting reading difficulties. Thus, those students who have been identified as having a phonological weakness require intense universal

instruction as well as quality individual or small group instruction. Torgesen (1998) found that, when phonemic awareness instruction is used as an intervention with students, greater intensity and duration should be implemented. While it is important for the duration of phonemic awareness instruction to increase when used as an intervention, the methods in which the instruction is delivered should also be altered.

When presenting phonemic awareness activities to students on an IWB the duration of the instruction is based upon the individual developmental levels. The National Association for the Education of Young Children or NAEYC (2011) did not offer any specific amount of time that emergent learners should work with technology but rather, stated that the use of technology in the classroom depends on the age, developmental level, needs, interests, and abilities of each student. Keeping the needs of individual students in mind, phonemic awareness activities can be altered immediately to match the needs of the student working at the board. Knowing the instructional level of each student before phonemic awareness instruction begins will create a natural starting point for determining the duration of instruction.

Phonemic Awareness Instruction Helps Students Learn to Read and Write

Reading is the skill that is the most central to learning. Berg & Stegelman (2003) stated that reading is the major route to all content in education thus it is critical that students develop accurate and fluent reading skills. Ehri, Nunes, Willows, Schuster, Yaghoub-Zadeh & Shanahan (2001) found that phonemic awareness is one of the best and most accurate predictors of how well students will learn to read. Students that have a well-developed sense of phonemic awareness have an easier time understanding the alphabetic principal which is vital in learning how to read. The alphabetic principal is defined by Harn, Stoolmiller, & Chad (2008) as the understanding that the letters of the alphabet and the phonemes they correspond with are used to

read words. NAEYC (2009) found that teachers should be provided with resources that support continuous progress for students who are having, or are at risk of developing, difficulties in learning to read and write. If a difficulty is identified with a student, developmentally appropriate steps should be taken to continue to move the student towards literacy acquisition.

There is a developmental sequence of phonemic awareness tasks that should be considered when students are learning to read. Ehri et al. (2001) offered the sequence to help understand how to plan instruction for emergent readers. The phonemic awareness tasks are listed from the easiest and most basic to the most difficult and are numbered from 1-6 (see Table 4).

Table 4

Phonemic Awareness Developmental Tasks

Level	Phonemic Awareness Task
1	Comparing initial sounds
2	Blending onset-rime into real words
3	Blending phonemes into real words
4	Deleting phonemes
5	Segmenting words into phonemes
6	Blending phonemes into nonwords

The ability for an emergent learner to segment words into individual phonemes has not only been found to help students sound out unfamiliar words within a given text, but can also help students when they are learning how to spell.

Phonemic Awareness Instruction Helps Students Learn to Spell

Emergent learners are often expected to spell as early as first grade. Often, the words students are asked to spell are found within a basal reading story, from the list found in a spelling program or from a set of high-frequency words provided in a reading series. Emergent learners often attempt to represent words in print before they can read. The representation of words may be random letters or letters that match the beginning phoneme of a word they are attempting to spell. The National Institute for Literacy (2001), notes that when students spell words, they are demonstrating an understanding of individual phonemes and can relate the sounds to letters. Furthermore, when emergent learners begin to spell unfamiliar words, the results bear little resemblance to conventional writing. The process by which emergent learners begin to write moves from scribbles to a gradual representation of the phonological structure of words is termed invented spelling (Ouellette & Sénéchal, 2008). Ouellette et al. (2008) found that over time, the invented spellings increase in phonological accuracy as children become more comfortable at capturing words in print.

Phoneme segmentation is the most useful phonemic instruction skill when teaching students how to spell. Although there is much emphasis placed on spelling, many students struggle with spelling (Graham, Harris, & Chorzempa, 2002). The most significant reason attributed to why students struggle is because they lack the fundamental ability to segment individual phonemes. Griffith and Olson (1992) found that students who acquired the skill of manipulating phonemes had more success when it came to word recognition and spelling.

Invented spelling can be a useful tool when assessing the level of students' phonemic awareness. This is accomplished by checking how many phonemes the student has written down when attempting to sound out a word. Manning (2005) also offers a leveling system to determining students' level of phonemic awareness in relation to invented spelling (see Table 5).

Table 5

Phonemic Awareness and Invented Spelling Levels

Level	Example
1	No segmentation or invented spelling
2	Student segments /m/-/k/ and writes “mk” for monkey
3	Student segments /a/-/p/-/l/ and writes “apl” for apple
4	Student segments /p/-/a/-/p/-/e/-/r/ and writes “papr”

The table indicates that students in the Level I category would not be able to segment and identify any phonemes. Students in the Level II category are able to positively identify one letter for a syllable. Students that are able to segment and write down a mixture of letters that represent a word with multiple syllables are in the Level III category. Finally, if a student is able to segment and write down most phonemes in a sentence and are using vowel sounds they are classified as being in the Level IV category. The last level has a bit more flexibility and does not need to include consonant blends or unfamiliar vowel sounds in order to be classified as a Level IV. The invented spelling level can help a teacher identify how much additional instruction is needed on phoneme segmentation to help a student to become more fluent at invented spelling.

Phonemic awareness is essential for emergent learners because it has been linked to future reading success. The development of phonemic awareness is supported through a variety of activities in a classroom. Some of the activities include music, stories, poems, and technology. Therefore, teachers should implement activities throughout the day to reinforce phonemic awareness skills. IWB technology can be used in classrooms to create lessons that are engaging and increase student motivation (Solvie, 2004). Any song, poem, or story used in a classroom to

promote phonemic awareness can be created on the IWB, thus making it interactive and engaging. Activities that are engaging in nature are beneficial to student learning. When students are engaged in a lesson, Beeland (2002) found there are fewer behavior issues, student attitudes are more positive, and less time is taken away from instruction.

Chapter III: Critical Analysis

Introduction

Based on the examination of the literature, it is evident that phonemic awareness is an essential piece of early literacy. Students that have an understanding of phonemic awareness have demonstrated greater reading success in later grades (Morris, Bloodgood, & Perney, 2003). The research regarding the development of phonemic awareness suggests that teachers have a variety of tools in which they should use during instructional times. Students are intrigued by technology and are proficient at using it. Several studies have indicated that technology is motivating to students and keeps them engaged. A summary of the literature, which discusses the key points and significant findings, is included in this chapter. In addition, implications and recommendations regarding this review of literature are reported.

Summary of Findings

The National Institute for Literacy (2001) stated that phonemic awareness instruction teaches students to notice, think about, and manipulate sounds in spoken language. Much of the research indicates that there are a variety of methods used to assist emergent readers in the development of phonemic awareness. Making instructional decisions that are based on students' interests, abilities, and individual developmental level enhances the likelihood for success. NAEYC (2009) stated that every student in a class is diverse; the ways that they learn are equally diverse.

The International Reading Association, or IRA (1998), found that teachers need to design lessons and activities that not only build on prior knowledge but also keep students with differing abilities in mind. There are many experiences during the school day that support the development of phonemic awareness. Woods (2003) noted that providing a print-rich

environment, having several individual and group opportunities for conversing, singing, exploring books, and writing, are all ways for students to become phonetically aware. One of the most recent instructional methods being used to teach phonemic awareness is the use of interactive whiteboards, or IWB.

The development of phonemic awareness can be enhanced by using technology as a tool to deliver instruction. Several studies have discussed the value of IWB technology and the effects it has on student engagement and involvement. A study reported by Smith, Higgins, Wall, & Miller (2005) indicated that students had increased attitudes and motivation when a lesson was presented on an IWB.

The IWB is an instructional tool with very few limitations when used for phonemic awareness instruction. Songs used in early childhood classrooms contain a wide variety of phonemic awareness skills which students easily identify with. Songs can be recorded, played back, and paused to identify phonemes on an IWB. Solvie (2004) reported that students were able to review text to identify phonemes, read aloud, and model reading and writing strategies which made the manipulation of the text challenging and engaging. Because of the vital role music plays in the development of phonemic awareness, combining it with technology is a way to enhance instruction.

Solvie (2004) found that when students were provided with sensory experiences using the IWB they were more engaged in the instruction. In a study by Beeland (2002) it was discovered that IWBs provided students with three different sensory experiences; visual, auditory, and tactile. Visual learning can range from pictures and text to more complicated features such as animation and video. Activities that involve auditory learning include displaying words on the IWB and playing sounds that segment, blend, or isolate phonemes. Allowing students to

physically interact with the board can help meet the needs of tactile learners.

Phonemic awareness instruction is an initial step in helping students begin to read and write. Emergent readers need a plethora of resources available to help develop the ability to read. Berg & Stegelman (2003) reported that appropriate early reading instruction contributes greatly to a student's later reading success and is most critical the first three years of school. Students who have a well-developed sense of phonemic awareness have an easier time understanding how to decode unfamiliar words they come across in written texts (Ehri, Nunes, Willows, Schuster, Yaghoub-Zadeh & Shanahan, 2001).

Phonemic awareness instruction is also crucial when emergent learners are beginning to spell words. There is a specific developmental sequence student's follow when learning how to spell. The sequence of skills include: rhyming, comparing initial phonemes, blending phonemes into words, segmenting phonemes (Ehri et al. 2001). Graham, Harris, & Chorzempa (2002) found that when students have an increased knowledge of spelling they can make sense of words they read allowing them to make complete connections when sounding out unfamiliar words. The most vital phonemic awareness skill to help emergent readers spell is phoneme segmentation. When students are segmenting words to hear all of the phonemes present they are beginning to spell (Ouellette & Sénéchal, 2008).

Implications

This literature review has many implications. First, the literature surrounding phonemic awareness indicates that there is a developmental process to learning phonemic awareness. Teachers who have the knowledge of this process can develop lesson and activities that are appropriate for the students they are working with. Second, teachers know that activities and strategies used with emergent learners must be engaging and challenging. They find ways to

integrate the skills of phonemic awareness into their everyday routines such as songs, fingerplays, stories, and through the use of technology. Integrating activities that focus on rhyming, phoneme identification, phoneme blending, and phoneme segmentation can support phonemic awareness development. Finally, when technology is used as a teaching tool with emergent learners, teachers can utilize the many features of the IWB to enhance children's developmental process of teaching phonemic awareness can assist in phonemic awareness instruction. Research is showing that IWB technology increases student motivation and engagement by using a multi-sensory approach (Beeland, 2002).

Recommendations

The literature regarding the strategies used to teach emergent learners phonemic awareness skills is extensive. Many of the activities teachers already implement can be used to teach phonemic awareness skills, including the use of technology. IWB technology has been shown to increase student motivation and engagement. However, because there is very little research on the benefits of using IWB technology on the development of phonemic awareness, there is a need for further research. The next step would be to conduct research that examines emergent learners in an environment where an IWB is present and used specifically for phonemic awareness instruction. It would be critical to assess and document student learning when using IWB for phonemic awareness activities and compare the results to students who are not using IWB for phonemic awareness activities.

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