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The Grapho-Phonemic Approach to Teaching Sight Words and Its Impact on First Grade Reading Fluency

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**The Grapho-Phonemic Approach to Teaching Sight Words
and Its Impact on First Grade Reading Fluency**

Taryn Ernst

Capstone Project: An Action Research Project

Northwestern College, Orange City, Iowa

Abstract

This action research study explored the connection between sight words and fluency. The researcher implemented an orthographic mapping intervention with a group of six first-grade students. Throughout the three-week study, students systematically examined the irregularities of first-grade sight words and mapped the expected and unexpected parts of the word. Students practiced reading these words in isolation and in context each week and were progress monitored using FastBridge sight word and CBMr assessments. The six participants were assessed on newly taught sight words as well as previously taught sight words. Data was collected to determine if the intervention resulted in long-term memory and recall of the words. Additionally, the researcher wanted to determine the impact the intervention had on passage reading. The action research study answers the question: How does the grapho-phonemic approach to teaching sight words impact first grade reading fluency? The findings from this action research project report that five of the six students increased in overall fluency and all six participants gained sight word automaticity over the course of the intervention. A dependent sample statistical analysis determined that the intervention made a statistically significant difference for both sight word and passage fluency. This study suggests that the grapho-phonemic approach to teaching sight words has a positive impact on first grade reading fluency.

Keywords: grapho-phonemic approach, orthographic mapping, sight words, fluency

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The Grapho-Phonemic Approach to Teaching Sight Words and Its Impact on First Grade Reading Fluency

Fluency is an essential component of becoming a reader. Students must be able to read words automatically to comprehend texts. These automatically read words are often referred to as sight words, irregular words, or high frequency words. The Iowa Core reading standard RF.1.3g states that first graders should be able to “recognize and read grade-appropriate irregularly spelled words” (Bellville, 2009, para 7). Irregular words consist of any word in which the student’s current phonics skills do not enable the reader to sound it out. Whereas some educators use whole word strategies to teach sight words, this action research study examines the impact the grapho-phonemic approach to teaching sight words can have on overall reading fluency for first graders.

Fluency is a challenge for many readers. January et al. (2017) share that 64% of fourth grade readers do not have sufficient fluency to support comprehension. Ehri (2020) found that word reading difficulties often negatively impact reading speed because nearly 75% of first grade reading passages consist of sight words. Reading these words is critical for fluency that supports comprehension (Petrilli, 2020). The problem is that students who have difficulty reading sight words also have difficulty reading fluently and therefore have difficulty understanding text. While many studies have asserted that direct, explicit, and systematic phonics instruction, flash card sight word reading, computer applications, and orthographic mapping improve sight word recognition skills, none of these studies have analyzed the impact on reading the sight words in context and how the approaches affect overall reading fluency (Petrilli, 2020; Miles et al., 2018; McArthur et al., 2015; Bautista, 2019; Ehri, 2020; Sayeski et al., 2019; Schlesinger & Gray, 2019).

The purpose of this action research study is to determine the impact of the grapho-phonemic approach on overall first grade fluency. The findings of this study will inform classroom teachers and administrators of the effects of using this approach on first grade reading fluency. The Science of Reading approach has been gaining popularity in the last 10 years; the data collected in this action research study will add to this body of research that supports the use of strategies included in the Science of Reading and Orton Gillingham curriculum.

Research for this paper was drawn from the ERIC (Education Resources Information Center) database, the WorldCat discovery tool through DeWitt Library, and Google Scholar. The author considered studies from the last 10 years that were published in peer-reviewed journal articles. These studies include research regarding the impact of teaching sight words in various ways, including flashcards, technology, games, physical activity, and orthographic mapping. The articles were used to develop an understanding of the current research and to identify areas of need for further study in regard to sight word instruction and fluency in the general education setting.

The principal finding of this study is the positive correlation between use of the grapho-phonemic approach to teaching sight words and improved overall fluency in reading a first-grade reading passage. This finding is valuable to educators who aim to increase fluency for emerging readers. By using the letter-sound analysis of the letters in irregular words, first grade readers improved not only their rate of sight word recognition, but also their overall fluency rate. This study confirms that the grapho-phonemic approach to teaching sight words results in increased sight word recognition and fluency on first grade reading passages. This study adds to the body of research related to increasing fluency for emerging readers.

The action research study includes a literature review, methodology, findings, and discussion sections. The literature review is organized into whole word approaches to reading words and phonic-based approaches to teaching sight words. These sections explain the current body of research regarding sight word instruction practices and the rationale for selecting the grapho-phonemic approach for teaching sight words. The purpose of this literature review is to discover if the whole word and grapho-phonemic approaches are effective in teaching sight words and improving overall reading fluency. The methodology section will explain the participants, setting, and procedures of the action research study. Data collected in this action research study answers the question: How does the grapho-phonemic approach to teaching sight words impact first grade reading fluency? The findings section shares the results of the study, and the discussion portion delves deeper into the importance of the findings, next steps, and future research opportunities.

Review of Literature

What is Fluency?

First-grade readers are considered emerging readers because first grade is a crucial year for young children learning to read (Murray et al., 2019). In first grade, students build their automaticity and fluency to support reading at a speed that helps students transition from “learning to read” to “reading to learn.” In their sight word reading research including seven students with autism, Alberto et al. (2013) define automaticity as “fast, effortless recognition of words in isolation” and fluency as “fast, effortless reading of words in sentences or passages” (p. 340). These statements about automaticity and fluency reinforce the importance of automatic word recognition in isolation and in context to developing reading fluency. In their quantitative study on sight word recognition, Grunke (2019) writes, “Word recognition automaticity is

indispensable for reading fluency, which in turn is a key foundation for text comprehension” (para. 2).

Phonics knowledge is critical in developing fluent reading skills. In their research on sight words and phonics training, McArthur et al. (2015) notes, “Phonic training had a significant effect on nonword reading accuracy and nonword reading fluency” (p. 404). This finding is significant because 76% of the 129 elementary students in their study demonstrated greater reading improvement when learning with phonics instruction as compared to sight word memorization. The research also adds an essential element to fluency: accuracy. Students must be able to read words quickly and accurately to build fluency that leads to comprehension. McArthur’s research explains that phonics training highly impacts overall fluency and accuracy.

The Iowa Core reading standard for foundational skills RF.1.4 states that students will be able to “read with sufficient accuracy and fluency to support comprehension” (Bellville, 2009, para. 1). The standard continues by explaining that accuracy, pace, and expression are all factors that increase fluency. According to the standard, being able to recognize words by sight, rather than decode each word, significantly improves reading fluency for emerging readers.

Defining a Sight Word

Sight words are an essential part of automatic word recognition, but they can be defined in a variety of ways. Reading researchers January et al. (2017) describe a sight word as “a word that is stored in memory and read automatically as a unit” (p. 3). Their sight word research explains that the purpose of sight words is to decrease the demand of decoding for a reader, increasing a students’ capacity for fluency and comprehension (January et al., 2017). In their five-week Incremental Rehearsal study, January et al. (2017) emphasize a whole word approach

as they define a sight word as any word a reader can read without attending to each individual sound in the word.

The literature review by Rawlins and Invernizzi (2019) aligns with the definition of sight words given by January et al. (2017). Rawlins and Invernizzi (2019) explain sight words as “automatically known words, where simply the sight of the word’s spelling provides immediate access to its pronunciation and meaning” (p. 712). iPad application researchers Musti-Rao et al. (2015), on the other hand, believe that sight words are “words that do not conform to phonetic rules” (p. 154). In their 103-student irregular word study, Murray et al. (2019) combine these definitions and describe two types of sight words. They believe sight words can consist of high frequency irregularly spelled words as well as any words read automatically by sight. The various definitions of a sight word can make it difficult for educators to determine which strategies and words to teach and expect students to know.

Further still, alphabetic principle researchers Miles et al. (2018) suggest three categories of sight words: regular, temporarily irregular, and permanently irregular. They explain that regular sight words can be decoded as in the words “up” and “it.” In their grapho-phonemic study, Miles et al. (2018) share that permanently irregular sight words, such as “said” and “what,” cannot be decoded. The last category of sight words, temporarily irregular sight words, depend on the child and the skills they have learned. For a kindergarten student, the word “like” is irregular because the student has not learned the phonics rule “silent e.” A second grader, however, would be able to decode the word “like,” making it no longer irregular. Temporarily irregular sight words will not always be irregular sight words and therefore will be in a category of their own. The literature review by Rawlins and Invernizzi (2019) supports this research: the

authors describe the irregularity of sight words as a continuum (p. 716). The researchers in these studies agree that grapho-phonemic skills can be used to read the irregular words.

The Integrated Literacy Curriculum research by Alberto et al. (2013) emphasizes the relationship between increased sight words and increased fluency (p. 341). Being able to recognize regular and irregular words by sight can positively impact the accuracy and pace of an emerging reader. Throughout their research, many experts have developed their own definition for sight words. Using expert knowledge, the sight words selected for this action research study included words that were currently irregular to the student based on their phonics knowledge.

Whole Word Strategies

One approach to teaching sight words is presenting the whole sight word in various ways such as computer applications and flashcards. Many studies have proven these approaches to be effective as they give students multiple exposures and opportunities to read the word. Several researchers have discovered a positive impact to sight word recall using whole word instructional strategies.

January et al. (2017) experimented with two different flashcard strategies for teaching sight words. The first study analyzed the results of the Traditional Drill strategy, where the teacher presented sight words on flashcards. The author observed that the error correction procedure paired with the scripted sight word procedure could increase student recall of the presented sight words. The four struggling readers in the study increased by an average of seven words per minute after the five-week intervention. The author did not assess the impact this strategy had on overall passage reading fluency.

The second experiment January et al. (2017) performed analyzed the results of the Incremental Rehearsal sight word strategy in which the teacher presented a targeted sight word

on a flashcard nine times amongst eight familiar sight words. The intervention required more than six minutes per new word for each student, but the author did find results that confirmed the targeted word moving into the long-term memory of the student. At a post assessment three weeks after the intervention, three of the four students involved in the intervention could recall 100% of the words introduced during the intervention. Given that the number of sight words a student can learn with this strategy is limited, the researchers questioned if the Incremental Rehearsal strategy was the most efficient method of teaching new sight words. The experiment did not determine the intervention's effect on overall fluency.

After completing these two experiments, January et al. (2017) designed a strategy called Strategic Incremental Rehearsal. The strategy combined the Traditional Drill and Incremental Rehearsal strategies to present new words more efficiently. Data collected from this intervention demonstrated a 0.24 word increase per week on a one-minute timed sight word assessment (January et al., 2017). Even though each of the strategies had positive effects on student sight word recognition, the author was not confident that any of the strategies would be effective or efficient in small group or whole group settings. None of January et al.'s (2017) research provided evidence as to how the flashcard strategies impacted overall fluency on a grade level passage. More research is needed to determine if the strategies are effective at increasing overall fluency for emerging readers.

Richardson et al. (2017) considered a visual approach to teaching sight words by embedding the target word within a picture on a flashcard. The researchers combined a picture and gesture to support the learning of the targeted sight word (Richardson et al., 2017). During the study, the visual and physical scaffolds were gradually reduced to emphasize the learning of the word. Richardson et al. (2017) concluded that the picture interfered with word recall as six of

the eight students were unable to identify the word when the support was removed (p. 68). This strategy was concluded to be ineffective at increasing sight word mastery because after three months, the participants gained an average of only two sight words per week. The study shows that students need deeper analysis of irregular words than pictures and gestures can provide.

In their iPad application research, Musti-Rao et al. (2015) explain the benefits of using technology to practice sight word reading. Much like the flashcard methods, their research involved applications that presented a stimulus and response to support students' independent practice of reading sight words. One significant benefit to using an application for sight word practice was the individualization for each student as the application adapted to student responses. The application also supported English language learners and students with disabilities as it presented accurate pronunciation with the spellings of the words (p. 152). Participants increased by an average of 48 words during the nine-month intervention (Musti-Rao et al., 2015). The research study found students to be more engaged in the learning, but this method did not result in a significant enough increase to catch students up to grade level expectations. This study did document sight word recall, but it did not determine the effect of the intervention on overall reading fluency.

Like Musti-Rao et al. (2015), Cazzell et al. (2020) performed a whole word intervention using computer-based flashcards. Their experiment included PowerPoint slides with stimulus response intervals of both three and five seconds. These researchers determined that there was no statistically significant difference between the two interventions as the three participants gained an average of 17 and 21 words for the three and five second intervals, respectively (Cazzell et al., 2020, p. 481). Whereas the repeated exposure positively impacted sight word recall, the researchers also discovered many challenges with focus, on-task behaviors, and engagement

throughout the use of the computer intervention. These technology-based interventions exposed students to whole words but did not result in increased overall sight word reading or reading fluency.

The review of teacher training research by Petrilli (2020) supports the Whole Language approach, which emphasizes reading words in context to determine their meanings. Petrilli (2020) shares that the Whole Language approach presents new sight words at a higher rate and requires higher level thinking. In their literature review, Rawlins and Invernizzi (2019) agree with the Whole Language approach, writing that reading words in context provides semantic richness. One weakness of this approach is a student's ability to transfer new words between different texts. Teacher training data reviewed by Petrilli (2020) supports the need for repeated exposure and practice in context and isolation to solidify new words into automatic recall.

Many of the whole word interventions tested by the researchers yielded positive results in sight word recognition for students of various ages. Whereas many of these interventions have proven to be effective for sight word recall in isolation, none of the experimenters tested the overall impact of the intervention on reading fluency. Several of the researchers also noted that these strategies were not effective for all students. Areas for further research mentioned by multiple researchers include reading words in context, determining if words were held in short- or long-term storage, and assessing the spelling of the irregular words to determine mastery.

Many researchers have found success through presenting new sight words with the whole word method, but several researchers disagree with the whole word approach and believe that the grapho-phonemic approach to teaching sight words is more effective. For example, the research of Murray et al. (2019), Miles et al. (2018), and January et al. (2017) discovered that the whole word approach was not effective for all students as some students would attempt to sound out the

irregular words. The next section will describe an alternative approach to the whole word methods, the grapho-phonemic approach.

Grapho-Phonemic Strategies

Many of the researchers who disagree with the whole word approach to reading sight words align their beliefs with the research of Linnea Ehri, who developed the grapho-phonemic approach to teaching reading in the 1970s. In her research summary, Ehri (2020) explains that phonics and spelling instruction have a greater impact on reading sight words than whole word strategies. Ehri (2020) emphasizes that students must make a connection between the graphemes and the phonemes of each word. Throughout her research, Ehri has described phonemes as individual units of sound and graphemes as the written representations of those sounds (Ehri, 2020). Much of the last section of this literature review explains the vast research available that pertains to the importance of connecting sounds to letters in sight word instruction.

Murray et al. (2018) agree with Ehri's Connectionist Theory as they explain the phases of alphabetic knowledge and how they impact developing readers. Murray et al. (2018) explain the pre-alphabetic phase as the ability to connect visuals and labels. Students in the pre-alphabetic phase might recognize a McDonald's symbol even though they cannot read the name McDonald's. Murray et al. (2018) describe the partial-alphabetic phase as when readers who can identify and blend consonant and vowel sounds. Finally, the researchers share that readers in the full-alphabetic phase can understand how patterns in words relate to other words. These alphabetic phases determine a reader's ability to decode regular and irregular sounds.

When teachers use the grapho-phonemic approach for teaching sight words, they guide students in identifying what makes each word irregular. Children perform orthographic mapping to build mental images of the irregular sounds and spellings in sight words. Students in the full-

alphabetic phase can make connections between the irregularities in “could” and “would.” Ehri (2020) explains that explicitly mapping the irregularities of sight words aids students in storing sight words in their long-term memory to help them recognize words more automatically in isolation and in context. In their research pertaining to exceptional readers, Sayeski et al. (2019) adds, “Knowing why a word is pronounced in a particular way can be empowering” (para. 16). When students encounter unexpected graphemes, the explicit teaching of the irregularities in words can demonstrate the connections between the spelling and pronunciations of irregular sight words.

Schlesinger and Gray (2017) affirm the benefits of the grapho-phonemic approach. In their ten-week multisensory research study, the researchers state, “Children utilize phonological skills to learn grapheme sounds” (p. 247). The researchers explain that orthographic knowledge includes mental representations of written words stored in memory. Schlesinger and Gray (2017) emphasize the importance of phonemic awareness and orthographic processing for the 11 students in their structured language research. The researchers describe orthographic processing as “the ability to acquire, store, and use orthographic knowledge” (Schlesinger & Gray, 2017, p. 248). In other words, orthographic processing pertains to a student’s ability to connect sounds to the letters that represent them.

Much of the research on the grapho-phonemic approach connects to Ehri’s discoveries on orthographic mapping. In her research on orthographic mapping, Ehri (2014) explains, “Orthographic mapping involves the formation of letter-sound connections to bond the spellings, pronunciations, and meanings of specific words in memory” (p. 5). Ehri (2014) adds that grapheme-phoneme connections are critical to word recognition. Explicit grapho-phonemic instruction provides readers with connections between how words are spoken and spelled.

Orthography allows students to connect the letters and sounds to the spelling and pronunciation of irregular words, helping students retain these words in long-term memory.

Several reading researchers agree that phonological awareness, orthographic awareness, and alphabetic knowledge are key to reading success. In their 3,104-student national phonemic awareness study, Carlson et al. (2013) state, “Among the reading measures, phonemic awareness at age 5 was a strong predictor of decoding at age 6” (p. 122). The researchers describe the Connectionist Theory as the critical relationship between phonemic awareness and decoding (p. 125). Their research determined that decoding efficiency impacts overall fluency and comprehension (p. 126). Johnston et al. (2014) conducted an orthographic mapping experiment with 180 six- to nine-year-old students. They explain, “When reading text, children encounter a mixture of regular and irregular words” (para. 28). Children learn to read irregular words by using the Connectionist Theory to identify irregularities in words using phonics and semantic knowledge. Phonological awareness is essential to developing orthographic maps of the irregularities in sight words.

Orthographic processing researchers Johnston et al. (2014) claim that orthographic knowledge and processing predicts reading skill and success. Phonological awareness researchers Gellert and Elbro (2017) confirm in their research that phonological awareness “contributed uniquely to the prediction of initial reading development in kindergarten and the first part of Grade 1” (p. 233). Readers must be able to hear the sounds in words and make connections to their spellings to read regular and irregular words. Phonological awareness is essential to orthographically mapping an irregular word because “during grapho-phonemic analysis students must simultaneously attend to the speech sounds within a pronounced word” (Rawlins & Invernizzi, 2019, p. 714)

McArthur et al. (2015) found, “The effect of phonics training was slightly larger than the effect of sight word training for word reading fluency” (p. 404). This point demonstrates how analyzing the irregularities of a word can have a greater impact than rote memorization of the whole word. Researchers Alberto et al. (2013) confirmed that decoding efficiency impacts overall fluency and comprehension in their 150-session research on connected text (p. 126). Students can be explicitly taught how to decode irregular words and identify irregularities. Using the grapho-phonemic approach can increase their overall reading accuracy and fluency.

One grapho-phonemic curriculum for teaching sight words, the Orton-Gillingham approach, contains interactive portions of multisensory engagement. The three-part drill invented by Samuel Orton and Anna Gillingham contains visual, auditory, and kinesthetic application of phonics skills (Bautista, 2019, p. 1). According to a literature review written by Bautista (2019), the Orton-Gillingham approach is “multisensory, sequential, incremental, cumulative, individualized, phonics-based, and explicit” (p. 2). The program’s focus is on using multiple senses because the creators believe that more senses being engaged means more learning styles can be accommodated in the classroom (Bautista, 2019, p. 2). The Orton-Gillingham approach uses phonics knowledge and orthographic mapping to explicitly teach the irregularities of sight words.

Chen et al. (2021) support the Orton-Gillingham approach as the researchers emphasize that physical activity helps the brain make connections to learning. In their 48-student Move to Read study, Chen et al. (2021) state, “Students learn through concrete learning experiences” (para. 2). The hands-on learning experiences in the Orton-Gillingham approach make learning concrete with manipulatives. The Orton-Gillingham approach also uses repetitive motions that connect the verbal and visual learning to the actions of the body. Chen et al. (2021) support this

strategy and share, “As children are engaging in a specific integrated phonemic awareness task repeatedly, they are not only able to recognize the word, but also able to associate the meaning of the word with the movement” (para. 21). After participating in an active motion intervention for one school year, Chen et al. (2021) discovered that academically struggling students were able to achieve scores in sight word tests comparable to the typical academic achieving students’ testing scores. The physical engagement of the Orton-Gillingham sight word approach can help students connect verbal and visual cues to irregular words in their long-term memory.

The Iowa Core reading standard for foundational skills RF.1.3g states, “Recognize and read grade-appropriate irregularly spelled words” (Bellville, 2009, para. 7). This standard comes under the subheading for phonics and word recognition, which states, “Know and apply grade-level phonics and word analysis skills in decoding words” (Bellville, 2009, para. 1). These standards demonstrate a strong correlation between decoding the expected or regular sounds and identifying the irregular spellings that are uncovered through the orthographic mapping process.

While many researchers agree with the grapho-phonemic approach to teaching sight words, some bring to light the challenges of the approach. Irregular word researchers Murray et al. (2018) note that the grapho-phonemic approach can challenge English language learners and students from homes that do not speak English because these students may have not had as many opportunities to be exposed to sounds and language. These students may be in the pre-alphabetic or partial-alphabetic phases of reading and need more exposure to the sounds of the English alphabet to be ready to make connections using the grapho-phonemic approach.

Another challenge presented by the grapho-phonemic approach is words that are classified as permanently irregular. These words pose a challenge because it makes it difficult to make grapheme-phoneme connections. In their 5-participant grapho-phonemic study, Miles et al.

(2018) suggest allowing students to explore invented spelling and pronunciation that allow children to compare the irregular spellings to the accurate pronunciation of the sight word (p. 720). Much of this research has shown that readers can learn to decode irregular sight words if explicitly taught with the grapho-phonemic approach.

Many of the studies analyzed throughout this literature review demonstrate the effectiveness of the whole word and grapho-phonemic interventions at increasing sight word recognition and automaticity. Several studies use words from Dolch, Fry, and Dale-Chall lists, yet none of the studies mention the effect on reading FastBridge sight word lists or the impact on reading fluency. Several whole word approaches have been proven effective for increasing sight word recognition throughout these studies. However, the whole word approach has not proven effective for the small group of students that have been identified for this action research study.

The articles in this literature review have provided evidence that the grapho-phonemic approach to teaching sight words can be effective at increasing sight word recognition. The eight-session study by Miles et al. (2018) determined that the grapho-phonemic approach positively impacted three out of four students in word recognition. More research is necessary to determine if the intervention can be effective for a larger group as well as if the grapho-phonemic sight word strategy impacts sentence reading fluency. The data collected throughout this action research project answers the question: How does the grapho-phonemic approach to teaching sight words impact first grade fluency?

Methodology

Research Question

How does the grapho-phonemic approach to teaching sight words impact first grade fluency?

Participants and Research Site

This action research study took place at Winterset Elementary School in Winterset, Iowa. The school is responsible for students from preschool through third grade. Winterset Elementary School receives Title I funding for reading instruction and interventions. In addition, 32% of the students in the building qualify for free or reduced meals. The action research study took place in a first-grade classroom that has 22 students: 11 females and 11 males. The class is 90% white, 5% Asian, and 5% Hispanic.

The researcher analyzed the effect of the grapho-phonemic sight word intervention for six emerging readers: 2 females and 4 males. The six students were selected because they did not meet the fall benchmark of 12 words read correctly per minute on the Sentence Reading assessment. Each of these students were considered adequately progressing at the fall benchmark but have been considered at-risk during past benchmark assessments. All six participants are Caucasian. They each participate in a 90-minute reading block consisting of 20 minutes of foundational skills, 20 minutes of comprehension skills, 36 minutes of independent work, and 12 minutes of small group instruction. The grapho-phonemic sight word intervention took place four days per week for 12 minutes each day as well as an additional 10 minutes each day during whole-group instruction. Two of these students receive an extra reading intervention four times a week for 20 minutes from a reading tutor who also uses Orton-Gillingham strategies.

After baseline data was collected for this study, the six readers ranged from 16 to 33 sight words per minute and between 7 and 27 words read correct on a Curriculum Based Measure in reading (CBMr) passage. Prorated goals for the baseline assessments were 24 sight words per minute and 18 words on CBMr. The winter benchmark goal for sight words is 49 words per minute, and the CBMr goal is 37 words per minute.

Intervention and Timeline

The researcher used Orton-Gillingham materials and strategies to explicitly teach three irregular words each week. The Orton-Gillingham approach includes a Red Word Book, colored tokens, red and green crayons, a tactile screen, and a pencil. Using this strategy, the teacher introduces the pronunciation of the word and asks the students to count and say what sounds they hear. The students proceed to describe what letters they would expect to make the sounds they hear. Following, the educator reveals the graphemes that connect to the phonemes as the students identify what is expected with green crayon, and what is unexpected with red crayon. After explicit instruction, students proceed to verbally spell, write, and read the irregular word in numerous ways involving the crayons and tactile screen. Lastly, the student writes a sentence including the target word. Students practice verbally spelling, writing, and reading the target words in many contexts throughout the week as well as review previously taught words.

The three-week intervention started in the third week of September and concluded in the second week of October. Baseline data was collected on the first day. The researcher used the FastBridge assessment system to record a one-minute timed reading of sight words as well as a one-minute timed reading of a first grade CBMr passage for each student. All students read the same sight words and passages to keep the data consistent.

Variables

The goal of this action research study was to analyze the impact the grapho-phonemic approach to teaching sight words has on first grade reading fluency. The independent variable in this study was the use of the grapho-phonemic approach to teaching sight words. This variable was the element the researcher was manipulating. The dependent variable was the effect this approach had on first grade reading fluency as measured by one-minute timed sight word and

CBMr passages on the FastBridge assessment system. The research was considered quantitative because it was designed to measure the cause-and-effect relationship of the intervention on fluency.

Measurement Tools

Data was recorded in an Excel Spreadsheet as well as on the FastBridge system. The FastBridge assessment system is managed by researchers from multiple universities across the country including the University of Minnesota, Georgia, Missouri, Buffalo, South Florida, Penn State, and Syracuse (Fastbridge Research, 2021). The researcher has completed the inter-rater certification to give the assessments for the action research. The Winterset Community School District is also in collaboration with the University of Minnesota to ensure the fidelity of the assessment process. According to FastBridge Research (2021), the CBMr assessment uses alternate form and test-retest data to ensure reliability. The predictive validity coefficient for the Sight Words assessment ranks strongly at 0.83 (Fastbridge Research, 2021)

Statistical Analysis

Data was analyzed using a dependent samples t-test. The dependent samples t-test is used to determine if the intervention group improves from pretest to post test. The data was used to determine if the intervention impacted sight word reading fluency as well as passage reading fluency.

Institutional Review Board

The researcher submitted an IRB exemption application for this action research study. The IRB exemption was approved because the research poses minimal risk to participants and involves normal educational practices and assessment. The researcher intends to follow the

guidelines of the IRB as sight words and fluency will be monitored through FastBridge which is the normal means of progress monitoring for the district.

The researcher typically serves as the teacher of the participants. To avoid personal bias, the researcher will request frequent fidelity checks from an academic coach. Their observations and feedback will guide the researcher in making decisions that align with the district-selected materials. This strategy will be used class wide.

Data Collection

The data for this action research project was collected using resources from the FastBridge assessment system. All data collected was quantitative as it consisted of numerical baseline and ending scores to determine students' growth in words read correctly per minute. The baseline fluency score was collected from a passage called "Jeff and Chuck" that derives from FastBridge. After a baseline was collected, the author implemented the sight word intervention being tested with the selected students each day. Every Friday, the researcher collected progress monitoring data for sight words and fluency using the FastBridge system. Each student completed a one-minute timed reading of sight words followed by a one-minute timed CBMr passage. The students read passages from the FastBridge system called "The Shore" at the end of the first week and "Luke and Kate" at the end of the second week. The final CBMr assessment was the same passage as the baseline assessment to allow for a true test-retest comparison.

The collected data was stored in the FastBridge system as well as in an Excel Spreadsheet. At the end of the three-week intervention, the researcher used the data to create line graphs to represent each student's progress as well as a bar graph to demonstrate the baseline and

final words per minute for each student. The data was used to determine what impact the intervention had on reading fluency.

Findings

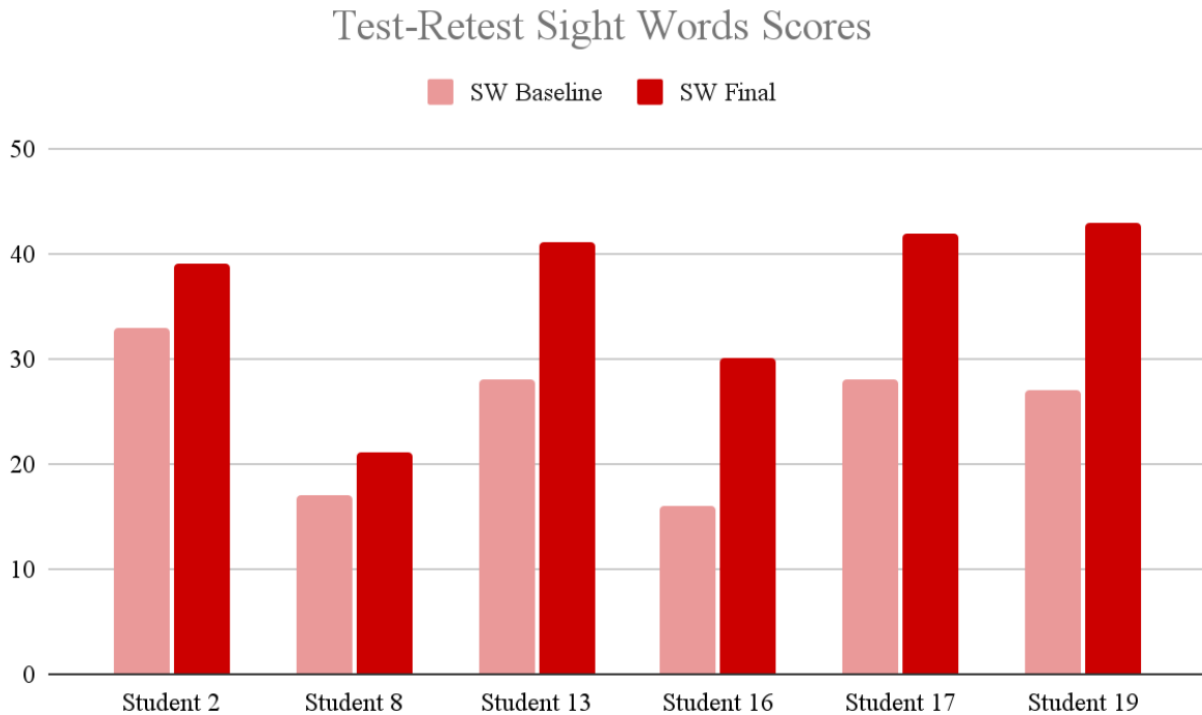
Data Analysis

The six students involved in the study were present for all 15 instructional days of the intervention. Each student experienced growth in sight word recognition, and five of the students showed increased reading fluency. The average baseline score for sight words was 24.83 words per minute as the scores ranged from 16 to 33 words per minute. At the end of the intervention, students averaged 36 sight words per minute and ranged from 21 to 43 words per minute. The average baseline score for CBMr was 13.33 words per minute as the scores ranged from seven to 27 words per minute. At the end of the intervention, students averaged 24.17 words per minute and ranged from 14 to 28 words per minute.

Figure 1 demonstrates student baseline and final reading scores for sight words read in a minute. Each student has a pink bar indicating their initial number of sight words read in a minute on September 23. A red bar indicates the final number of sight words read in a minute on October 14 for each student.

Figure 1

Sight Words Test-Retest Scores



The results calculated after the final data collection demonstrate the students gained an average of 11.17 sight words per minute. Students gained between four and 16 sight words during the three-week intervention. Five of the students are now on track to meet the winter benchmark score of 49 words per minute as they met or passed the prorated goal of 30 sight words per minute on October 14.

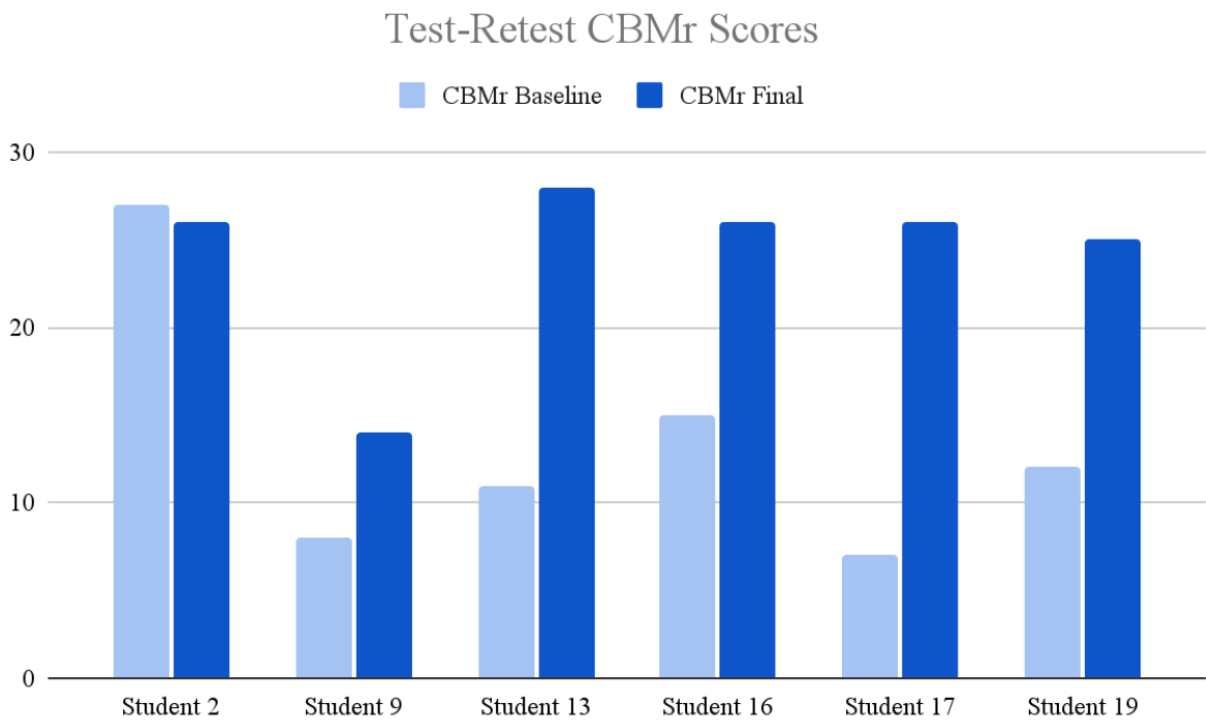
A dependent samples t-test was conducted to determine whether there was a significant change in students' sight word reading using the grapho-phonemic approach. A baseline assessment revealed students were able to read an average of 24.83 sight words per minute ($M = 24.83$, $SD = 6.79$). Students participated in a three-week intervention where they orthographically mapped irregular words. Following the intervention, students were able to read an average of 36 sight words per minute ($M = 36$, $SD = 8.72$). Results of the dependent samples two-tailed t-test reveal a significant difference between the baseline and final assessment, $t(5) = -$

5.564, $p < .003$. The orthographic mapping intervention correlated with increased sight word recognition.

The data in Figure 2 demonstrates student baseline and final data collected for passage reading fluency. Students read a one-minute timed passage to collect a baseline for words read correctly in one minute (indicated by the light blue bar). On the final day of the intervention, the researcher listened to the students read the same passage as the baseline assessment and recorded the number of words read correctly per minute (indicated by the dark blue bar).

Figure 2

CBMr Test-Retest Scores



The results calculated after the final data collection determined that students gained an average of 10.83 words per minute. The students ranged from negative one word to 19 words gained in a minute. Five of the six students are currently on track for the winter benchmark goal

of 37 words per minute as they met or passed the prorated goal of 24 words read correctly per minute on October 14.

A dependent samples t-test was also conducted to determine whether the intervention produced a significant change in passage reading fluency. A baseline assessment revealed that students were able to read an average of 13.33 words per minute ($M = 13.33$, $SD = 7.28$). Using the same orthographic mapping intervention, students were able to read an average of 24.17 words per minute ($M = 24.17$, $SD = 5.08$). Results of the dependent samples two-tailed t-test reveal a significant difference between the baseline and final assessment, $t(5) = -3.592$, $p < .016$. The orthographic mapping intervention correlates with an increase of words per minute for passage reading.

Discussion

Summary of Major Findings

This action research study consisted of six first-grade students learning sight words through the grapho-phonemic approach. The aim of the study was to determine what impact this intervention had on first-grade passage reading and if it was an effective method of teaching and learning irregular sight words. Using Orton-Gillingham materials and scripts, the students studied the irregularities of the words and practiced them in isolation and in context over the course of the three-week intervention.

Each of the six students involved in the study experienced growth in sight word reading, and five of the six students experienced growth in passage reading during the intervention. On average, the students were able to read 11.17 more sight words per minute at the end of the intervention. Participants were also able to read an average of 10.83 more words per minute on a

passage at the end of the three-week study. This reading growth demonstrates a positive correlation between gains in sight word fluency and gains in passage reading fluency.

The statistically significant difference in fluency following an orthographic mapping study appears to be because the intervention is multisensory, structured, and repetitive, as highlighted in the literature review. Students were able to receive immediate feedback and corrections over the course of the week, placing the newly taught irregular sight words in long-term memory. The findings of this study suggest that the grapho-phonemic approach to teaching and learning sight words is an effective learning strategy for emerging readers with alphabetic knowledge and should continue to be used in first grade classrooms to improve sight word and passage reading.

Limitations of the Study

One of the major limitations to this study was the small sample size. The six-participant group was homogeneous because they were selected for the study due to their current reading abilities. The students also had similar socioeconomic and cultural backgrounds. Further research is necessary to determine if this strategy is effective for all types of learners such as students with varied alphabetic knowledge and students from more diverse backgrounds. Additionally, the short amount of time allotted for this action research study could impact the results because the strategy could have alternative outcomes if done for a longer amount of time. More research is necessary to determine if this strategy is as effective for an extended period. Another limitation is that there was not a control group to compare the data between students getting typical instruction and this intervention.

Further Study

The next step will be to extend the intervention to the 16 other students in the classroom and monitor their growth throughout the school year. This action will allow for a larger, more diverse group to be studied as the class has varying cultural, socioeconomic, and reading backgrounds. In addition, extending the study for a longer duration will help to determine if the strategy is effective for all students over time. Further study of sight word spelling assessments can also reveal how students have stored the irregular words in long term memory (January et. al, 2017).

Another future step will include implementing this action research in other first-grade classrooms in the building and beyond. First, teachers will be presented with the findings and an analysis of the results to encourage them to use the grapho-phonemic intervention with their students. Next, teachers will participate in a training to ensure that the implementation is valid and reliable (Bautista, 2019, p. 2). This process ensures that teachers have proper support, materials, and training to implement the grapho-phonemic strategy into their daily literacy instruction.

Conclusion

Sight words make up 75% of what first graders read in passages and are critical to developing fluency (Ehri, 2020). First-grade readers must be able to automatically recognize sight words to build fluency and comprehension skills (Grunke, 2019). This literature review and action research study demonstrate the results of a small group grapho-phonemic intervention to help increase sight word and passage reading fluency. Using the orthographic mapping strategy supports passage reading growth as evidenced by the six students participating in the three-week study. The research confirms Miles et. al's (2018) research pertaining to how orthographic

mapping improves sight word retention and automaticity. It also adds to the body of research on orthographically mapping sight words by contributing the results of the approach on overall passage fluency. The findings of this study indicate that this type of intervention increases sight word recognition and overall reading fluency for emerging readers.

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