TeachME PROFESSIONAL DEVELOPMENT
CEUs for Teachers and Educators

Introduction to the Science of Reading

Introduction

"Introduction to the Science of Reading" is a course designed to provide educators with essential knowledge and practical strategies for reading instruction rooted in the science of how students learn, aiming to enhance their instructional practices. In this dynamic and engaging course, we'll explore the science behind reading, unraveling its complexities and unveiling evidence-based approaches to foster literacy development in learners of all ages.

In Section 1, we'll lay the groundwork by understanding the fundamental concepts of the Science of Reading (SoR). We'll look into the historical context of reading instruction, examining the evolution of methodologies and the enduring debate known as the Reading Wars. From there, we'll explore how the brain learns to read, dissecting the intricate processes involved. Through a comprehensive review of research and evidence, we'll unravel the key components of the SoR, as well as common misconceptions surrounding it.

Moving into Section 2, we'll dive deep into the five pillars of science-based reading instruction: phonemic awareness, phonics, fluency, vocabulary, and comprehension. Likewise, we will discuss the Simple View of Reading (SVR) and Scarborough's Reading Rope, which are the central models that SoR practices are based upon. Finally, we'll bridge the gap between theory and practice by examining the implications of the SoR for teaching. We'll explore practical instructional approaches, such as Structured Literacy, grounded in evidence-based principles, empowering educators to apply the science of reading in their classrooms effectively.

Throughout this course, our aim is not just to impart knowledge but to empower you as educators to become agents of change in the literacy landscape. By embracing the science of reading and applying evidence-based practices in your

instructional approach, you'll not only transform the reading experiences of your students but also ignite a lifelong love for learning.

Section 1: What is the Science of Reading?

Section 1 of this course aims to unravel the mysteries behind one of the most essential skills in education—reading. In this section, we will explore the intricate science that underpins reading instruction, exploring its historical context and the cognitive processes involved. We'll begin by demystifying the SoR, shedding light on what it entails and why it holds such significance in education today. By examining the historical evolution of reading instruction, including the contentious "Reading Wars," we'll gain insights into the diverse methodologies and philosophies that have shaped the landscape of literacy education.

Next, we'll explore the fascinating journey of how the brain learns to read. Contrary to popular belief, reading is not a natural skill but rather a complex cognitive process that requires specific neural pathways to develop. We'll uncover the intricate mechanisms involved in reading development, including the cognitive functions of the brain during reading tasks. Through an exploration of models such as the Simple View of Reading, the Scarborough Reading Rope, and the Phases of Word-Reading Development, we'll gain a deeper understanding of the multifaceted nature of reading and the intricate interplay between its various components. We will conclude Section 1 by discussing some of the common misconceptions about the SoR, and explaining the facts behind them.

1.1 Understanding the Science of Reading: What it is & Why it Matters

The Science of Reading (SoR) Defined

The Science of Reading (SoR), as outlined by the National Center on Improving Literacy (2022), is a body of "research, over time, from multiple fields of study using methods that confirm and disconfirm theories on how children best learn to read." It involves rigorous investigation over many years, utilizing diverse methodologies to validate and refine theories on optimal reading instruction methods. At the center of the SoR research is what the National Reading Panel labeled as the "big five" foundational pillars for literacy development (National Center on Improving Literacy, 2022; Gewertz, 2020):

- **Phonemic Awareness:** The ability to recognize and manipulate individual sounds in spoken words.
- **Phonics:** Instruction focused on understanding the relationships between letters and sounds, enabling students to decode words and grasp spelling patterns.
- **Fluency:** The capacity to read with accuracy, speed, and expression, encompassing word, phrase, sentence, and story-level reading.
- **Vocabulary:** Acquiring knowledge of word meanings and usage, facilitating comprehension and communication.
- **Comprehension:** The skill of understanding and interpreting written text, enabling readers to derive meaning and make connections.

Ultimately, the National Reading Panel found that the majority of students will become better readers "with explicit, systematic phonemic awareness and phonics instruction, as well as instruction in fluency, vocabulary, and reading

comprehension" (Gewertz). These five key components will be discussed in length in Section 2.

In addition, the SoR is characterized by its dynamic nature, continually evolving alongside advancements in research, changes in demographics, and shifts in instructional approaches (National Center on Improving Literacy, 2022). As populations diversify and educational paradigms evolve, so too must reading instruction practices adapt to meet the needs of all learners. However, it is important to clarify what the SoR is not. It is not a packaged program, intervention, or product that can be purchased and implemented as a one-size-fits-all solution. Instead, it represents an evidence-based approach to teaching reading, informed by decades of research and tailored to address the unique needs of diverse learners (National Center on Improving Literacy).

Main Tenet of the SoR

Systematic & Explicit. The SoR highlights the critical importance of explicit and systematic phonics instruction. Systematic phonics programs are characterized by a structured approach that teaches letter-sound correspondences in a deliberate sequence, ensuring that students master each phoneme before progressing to the next (Schwartz & Sparks, 2019). Rather than leaving students to decipher letter-sound connections independently, teachers explicitly teach these relationships.

In a 2015 study led by Stanford University neuroscientist Bruce McCandliss, participants were taught three-letter words in a newly created written language either by focusing on letter sounds or whole words (Schwartz & Sparks, 2019). Later, they were tested on both the taught words and new words in the language while their brain activity was monitored with an electroencephalograph. Those taught to focus on letter sounds exhibited increased neural activity in the left side of the brain, associated with skilled reading, while those taught whole words showed more activity in the right side, typically linked to reading difficulties.

Additionally, participants who learned letter sounds were more proficient in identifying unfamiliar words.

The benefits of systematic phonics instruction are particularly pronounced in early readers, with improvements observed in decoding ability and reading comprehension across various student demographics, including those at risk of reading difficulties, children with disabilities, and English-language learners (Schwartz & Sparks, 2019).

Why the SoR Matters

The SoR is crucial for ensuring that all children have the opportunity to learn to read proficiently, and it underscores the need for educators to be equipped with effective, research-based, literacy instruction strategies. As highlighted by Ellis et al. (2023), a significant portion of students in the United States—approximately 1.3 million fourth graders—struggle to read at a basic level. The consequences of not acquiring proficient reading skills are profound and enduring, with far-reaching implications for individuals' educational and socioeconomic trajectories.

Research indicates that students who are not reading at grade level by fourth grade are at a significantly higher risk of dropping out of high school, leading to reduced lifetime earnings, increased rates of unemployment, and heightened susceptibility to involvement in the criminal justice system (Ellis et al., 2023). Furthermore, this challenge disproportionately affects students of color, those with learning differences, and those from low-income backgrounds, exacerbating existing disparities in life outcomes.

However, the grim reality of the reading crisis is not insurmountable. Research conducted over five decades has identified scientifically based reading instruction as the solution to addressing reading difficulties effectively (Ellis et al., 2023). This evidence-based approach, grounded in the SoR, offers a clear path forward for

educators to mitigate the rate of reading failure. Studies suggest that by implementing scientifically based reading instruction, over 90% of all students, including those with reading difficulties, could attain proficiency in reading, underscoring the potential for transformative change in literacy education (Ellis et al.).

In essence, the Science of Reading provides a roadmap for educators to deliver high-quality literacy instruction that empowers all students to achieve reading success, thereby dismantling barriers to equitable educational opportunities and fostering brighter futures for generations to come.

Historical Context: Evolution of Reading Instruction (Reading Wars)

Reading is one of the most critical skills for achieving success in life. Despite its importance, data from the National Assessment of Educational Progress (NAEP) reveals that only approximately 35% of American children demonstrate proficiency or higher in reading (Lexia, 2022). Even more concerning is the persistence of these low literacy rates over decades, with little to no improvement observed in American schools. This long standing issue has sparked intense debate among educators and policymakers, commonly referred to as "the reading wars" (Lexia). This clash revolves around two main approaches: "whole language" and phonics, each advocating for distinct methodologies in teaching reading.

Whole Language Approach

The "whole language" approach to reading traces its roots back to the 1800s, notably championed by Horace Mann, often hailed as "the father of American education" (Lexia, 2022). Mann, a prominent politician and advocate for literacy, expressed concerns about teaching children to decode words letter by letter, fearing that it would detract from their understanding of the words' meanings.

Consequently, many schools adopted Mann's ideology, emphasizing the memorization of whole words rather than focusing on phonetic decoding.

Whole language education centered around literature, immersing students in reading and writing activities under the belief that reading skills would naturally develop within the context of meaningful texts (Lexia, 2022). By the 1950s, the whole language approach had become entrenched as the prevailing method for teaching reading, promoting the idea that children should learn to read for meaning from the outset. This philosophy manifested in the "look-say" or "whole word" reading method, exemplified by the popular Dick and Jane books that dominated American classrooms from the 1940s to the 1960s. In this approach, students were encouraged to memorize sight words and utilize context and visual cues from pictures to comprehend texts.

Research supports the notion that whole language instruction emphasizes comprehension and meaning-making in reading (Lexia, 2022). However, critics argue that its reliance on memorization and context cues may not adequately equip students with the phonetic decoding skills necessary for decoding unfamiliar words independently. Moreover, the efficacy of the whole language approach has been questioned, particularly concerning its impact on struggling readers and students from diverse linguistic backgrounds (Lexia).

In recent years, the whole language approach has faced scrutiny, with educators and policymakers increasingly advocating for a balanced approach that integrates elements of phonics instruction alongside comprehension-based strategies (Lexia, 2022). This shift reflects a growing recognition of the importance of both decoding skills and comprehension abilities in fostering proficient reading.

Phonics Approach

The phonics approach to literacy instruction emerged as a counterpoint to the whole language methodology, advocating for explicit teaching of the relationship between letters and sounds. Unlike whole language, which emphasizes meaning-making and context, phonics instruction prioritizes the systematic teaching of letter-sound correspondences (Lexia, 2022). This approach has deep historical roots, dating back to the publication of the New England Primer in 1690, making it older than the whole language approach itself (Lexia). However, phonics faced a decline in popularity during the 19th century with the rise of the whole-word method promoted by Horace Mann.

Phonics instruction adopts a bottom-up approach, focusing on building foundational skills from letters and sounds to words, in contrast to the top-down approach of whole language (Lexia, 2022). Supporters of phonics advocate for skill-based instruction, often employing drills to reinforce letter sounds and blends before advancing to comprehension tasks. Despite the dominance of whole language instruction in American schools for much of the 20th century, phonics continued to persist, buoyed by proponents such as author and readability expert Rudolf Flesch.

Flesch's influential book *Why Johnny Can't Read—and What You Can Do About It*, published in 1955, ignited national discourse on literacy education (Lexia, 2022). Flesch argued that the lack of explicit phonics instruction in American schools hindered students' ability to read proficiently, citing alarming statistics that many third-grade students struggled to decode basic vocabulary. This publication catalyzed the reading wars, a contentious debate between advocates of whole language and phonics instruction that continues to shape literacy education today.

Enter the SoR

The emergence of the Science of Reading can be traced back to the 1960s, as researchers increasingly scrutinized the effectiveness of literacy instruction methods (Lexia, 2022). Jeanne Chall, head of the Harvard Reading Laboratory, played a pivotal role in this movement with her groundbreaking publication "Learning to Read: The Great Debate" in 1967. Through a comprehensive four-year study encompassing existing research, interviews with education experts, and analysis of reading methodologies, Chall concluded that explicit and systematic phonics instruction surpassed the traditional whole language approach (Lexia).

Chall's research underscored the importance of phonics instruction, emphasizing the necessity of a structured and systematic approach to teaching reading (Lexia, 2022). Her subsequent works further reinforced the notion that mastering basic reading skills through explicit instruction is foundational to later reading comprehension and academic success.

The findings of Chall and other researchers in fields such as education, neuroscience, and psychology laid the groundwork for what would eventually be recognized as the Science of Reading (Lexia, 2022). This interdisciplinary body of research synthesizes insights from various disciplines to inform evidence-based literacy instruction practices, marking a significant shift in the approach to teaching reading.

Whole Language Remains

Despite efforts by advocates of evidence-based instruction such as Chall and Flesch to promote phonics instruction in the 1960s, the dominance of whole language persisted in public schools throughout the 1970s and 1980s, leading to limited improvement in literacy rates (Lexia, 2022). Whole language proponents like Reading Researcher Kenneth Goodman and Frank Smith played a key role in maintaining the prevalence of the whole language approach. Goodman famously

characterized reading as a "psycholinguistic guessing game," while Smith argued that reading is a natural process akin to speaking, dismissing the complexity of phonics rules (Lexia).

In 1967, Goodman proposed the idea that readers rely on three distinct systems of information to comprehend text, referred to as the three cueing system: syntactic cues, which involve understanding the structure of sentences and narratives; semantic cues, which pertain to grasping the meaning conveyed by the text; and grapho-phonemic cues, which involve deciphering letters and their associated sounds (Schwartz, 2023). Goodman suggested that attending to all these sources of information could enhance children's reading proficiency.

During the 1970s, cognitive psychologists approached reading research from a different angle. They began exploring the cognitive processes underlying skilled reading through laboratory experiments rather than classroom observations (Schwartz, 2023). Eye-tracking studies conducted in these controlled settings aimed to determine whether proficient readers indeed skip letters and words while reading or if they focus on individual letters. Experimental studies tested different instructional methods and consistently demonstrated the effectiveness of explicit, systematic instruction in phonics and phonemic awareness. Subsequent brain imaging studies further supported the benefits of explicit decoding instruction, showing that it could positively alter the brain functioning of struggling readers, aligning their neural activation patterns with those of proficient readers.

Further research during this time revealed that poor readers, rather than proficient ones, relied on the context-based word recognition emphasized by the whole language approach (Lexia, 2022). Contrary to the whole language philosophy, proficient readers processed all visual information in the text without skipping unknown words or letters. Additionally, studies indicated the critical

importance of phonemic awareness skills in developing strong reading abilities. However, despite these findings being published in scholarly journals and presented at academic conferences, they had limited impact on educational practices at the time.

Balanced Literacy Approach

In the 1990s, a new instructional approach emerged known as Balanced Literacy, originating in California as a response to low reading scores (Lexia, 2022). The concept aimed to integrate elements from both whole language and phonics methodologies. Balanced literacy emphasizes providing children with quality literature and various supports and strategies to foster reading skills, with some phonics instruction included but not consistently structured (Gewertz, 2020). In essence, balanced literacy seeks to harmonize different facets of instruction, including skill-based and meaning-focused activities, as well as reading and writing tasks, conducted in various settings ranging from whole-group to independent configurations.

Balanced Literacy brought about a notable change in reading instruction by introducing a system of leveled readers (Gear, 2021). Leveled readers are organized into different levels based on factors such as vocabulary complexity, sentence structure, and content difficulty. The goal of leveled readers is to provide students with books that are appropriately matched to their current reading abilities, ensuring that they are neither too challenging nor too easy (Schwartz, 2023c). To determine a child's reading level, assessments are implemented. Based on these assessments, teachers select leveled books that are appropriately challenging for each student, promoting continuous progress. These leveled texts prioritize meaning and frequently incorporate high-frequency words like "said," "where," and "out," as well as common syntactic patterns (Schwartz).

In practice, teachers often group students into leveled reading groups based on their individual achievement levels. These groups allow teachers to provide targeted and differentiated instruction that meets the specific needs of each group of students (Schwartz, 2023c). During guided reading sessions, teachers work closely with each group, providing support and instruction tailored to the level of the text.This approach allows students to advance from easier to more challenging texts as they acquire new skills.

However, the interpretation and implementation of balanced literacy have become increasingly varied over time, often reflecting the preferences of individual educators (Lexia, 2022). Generally, it emphasizes personalized instruction tailored to students' needs while fostering a passion for reading. Since its inception, balanced literacy has gained widespread adoption in American schools, with approximately 72% of teachers citing it as their primary instructional approach (Lexia).

Research. Despite its widespread use, there is little research that proves its efficacy due to its variation in practice (Schwartz, 2023c). Likewise, increasing evidence indicates that this method does not effectively enhance the reading skills of struggling students (Schwartz, 2023c). Research has demonstrated that the mechanisms used in prevalent leveling systems often fail to precisely assess students' capabilities. Moreover, segregating students into high and low-performing groups can exacerbate existing achievement disparities (Schwartz). The flexible nature of Balanced Literacy programs may not adequately meet the needs of all students, particularly those with learning disabilities such as dyslexia, as it often lacks the structured and explicit instruction necessary for their success (Gewertz, 2020). As a result, while balanced literacy has demonstrated success for some students, its suitability for all remains uncertain. Despite these findings, many elementary schools and teacher-preparation programs continue to adhere to balanced literacy practices (Gewertz).

Balanced literacy has also been facing increasing criticism as educators observe persistent reading difficulties reflected in national assessment scores. The 2019 National Assessment of Educational Progress revealed stagnation in reading proficiency among 4th and 8th grade students over the past decade, with a decline in reading performance between 2017 and 2019 (Gewertz, 2020). Alarmingly, only a minority of students demonstrate proficiency in reading, highlighting the inadequacies of current approaches like balanced literacy.

Continued Research & Structured Literacy

Over the past fifty years, educators and scholars have contributed to the extensive research body known as the SoR, drawing insights from diverse fields such as education, literacy, psychology, cognitive science, and neuroscience. This ongoing investigation has shed light on the intricacies of how the brain learns to read and has provided invaluable guidance for effective reading instruction (Lexia, 2022).

The evolution of the SoR has transcended mere phonics instruction. In 2000, the National Reading Panel identified five essential components for successful reading instruction: phonemic awareness, phonics, fluency, vocabulary, and comprehension (Lexia, 2022). Building upon this framework, the International Dyslexia Association introduced the concept of "Structured Literacy," encompassing a comprehensive approach to language instruction; Structured Literacy emphasizes explicit, systematic, cumulative, and diagnostic teaching methods, covering not only the foundational concepts identified by the National Reading Panel but also expanding to include word recognition, written expression, and both listening and reading comprehension (Lexia). Notably, Structured Literacy has demonstrated effectiveness for all students, particularly those with dyslexia, making it an indispensable approach in literacy education. Structured Literacy will be discussed in detail in Section 2.

Looking Ahead

The SoR is witnessing a surge in legislative activity, reflecting a growing recognition of the importance of evidence-based reading instruction (Gewertz, 2020). While legislative efforts to improve reading have long been in place across many states, recent trends indicate a heightened emphasis on research-backed methodologies. In particular, newer laws are delineating the key components of effective reading instruction, drawing from seminal reports such as the National Reading Panel's findings. Additionally, there is a notable focus on enhancing the entire spectrum of reading instruction, extending beyond just aspiring teachers to encompass district leaders, principals, and classroom educators. Most initiatives target K-3 educators, although some extend requirements to K-6 teachers and even high school instructors.

Collaborative efforts among states are becoming increasingly prevalent, with state superintendents convening to strategize on holding teacher-preparation programs accountable for integrating effective reading instruction, advocating for high-quality, research-based curricula, and supporting districts in fostering skilled reading teachers (Gewertz, 2020). Furthermore, states are actively sharing strategies and resources to advance the SoR agenda. Notably, the Foundation for Excellence in Education has developed model legislation on the Science of Reading, with 18 states expressing interest in adopting it. These developments signal a promising trajectory for the future of literacy education, characterized by a concerted effort to align instructional practices with research-supported approaches to reading instruction.

States in Action

Arkansas. In Arkansas, recent legislation reflects a comprehensive approach to implementing the SoR in schools. Beginning with the 2017 Right to Read Act, a series of laws have been enacted to reform reading instruction across the state

(Gewertz, 2020). These laws impose new requirements on all facets of the reading-instruction pipeline.

Colleges of education are mandated to incorporate "scientific reading instruction" into their curriculum and administer a stand-alone reading test, which aspiring teachers must pass to obtain licensure (Gewertz, 2020). School districts are obligated to provide training in evidence-based reading instruction, offering various pathways for K-6 teachers to demonstrate proficiency, such as taking a test or undergoing evaluation by an administrator trained in reading instruction assessment.

Furthermore, educators in all grades and subjects, as well as administrators, must exhibit "awareness" of the science of reading (Gewertz, 2020). The state was tasked with developing a list of literacy-curriculum materials aligned with evidence-based reading instruction, with districts required to purchase from this list. Implementing these requirements presents significant challenges, with efforts to train the state's certified teachers underway. Arkansas allocated resources, including a $1 million annual fund from the governor's rainy-day fund, to support literacy training initiatives (Gewertz, 2020). While progress is being made, there is acknowledgment of the need to address skepticism and resistance among educators accustomed to traditional literacy approaches.

District leaders, like Bruce Orr from Arkansas' Lakeside District, are navigating these changes by prioritizing face-to-face training and skilled observation methods for teachers (Gewertz, 2020). Orr himself participated in training alongside K-2 teachers, while principals underwent specialized training to become evaluators of reading instruction. Despite the challenges, Arkansas remains steadfast in its commitment to implementing evidence-based reading practices statewide.

Mississippi. Mississippi has emerged as a trailblazer in implementing science-based reading instruction, setting a precedent for other states to follow. Since

2003, Mississippi has mandated colleges of education to offer two courses focused on essential components of effective reading instruction (Gewertz, 2020). Over time, additional requirements were introduced, including a reading science test for teacher-candidates and a mandate for elementary schools to certify that their curricula cover key reading components. The state allocates $15 million annually for professional development, literacy coaches, and other support services, demonstrating a significant investment in improving reading instruction (Gewertz).

The success of Mississippi's initiatives has garnered national recognition, notably evidenced by its improvement in 4th-grade reading scores, from only 21% scoring “proficient” on the 2013 NAEP, to 32% on the 2019 NAEP (Gewertz, 2020). This achievement is particularly remarkable considering that Mississippi was the only state to see an increase in proficient scores. The state's own 3rd-grade reading test results have also shown improvement over the years.

Building on this success, Mississippi is now targeting faculty members of educator-preparation programs, aiming to ensure they possess expertise in the science of reading (Gewertz, 2020). However, resistance from education school deans has stalled the implementation of this proposal. Despite growing momentum for evidence-based reading instruction, challenges persist. Some educators are hesitant to deviate from traditional methods, and opposition to a shift toward evidence-based approaches remains. Additionally, skepticism from literacy experts highlights ongoing debates within the education community regarding the efficacy and longevity of such instructional movements (Gewertz).

1.2 Theoretical Models Behind the SoR

Understanding the intricate process of reading is crucial for educators and researchers alike, and three prominent models that shed light on this complexity

are Scarborough's Reading Rope, the Simple View of Reading, and the Phases of Word-Reading Development. These models serve as foundational frameworks for comprehending the SoR research and explaining how the human brain learns to read. While both models share common ground in identifying various components that shape reading proficiency, they diverge in their conceptualization and emphasis on these components. Through exploring these models, we gain valuable insights into the multifaceted nature of reading development and the essential factors that contribute to proficient reading skills.

The Simple View of Reading

The Simple View of Reading (SVR), proposed by Gough and Tumner in 1986, offers a straightforward framework for understanding reading comprehension (Lexia, 2023). According to this model, reading comprehension is the product of two essential skills: word recognition and language comprehension. These two components are depicted as factors in a multiplication equation, emphasizing that neither skill alone is adequate for proficient reading—both are necessary for successful comprehension. In essence, the equation reads: *Decoding (Word Recognition) x Language Comprehension = Reading Comprehension.*

In the SVR, decoding encompasses three skill components: phonology, orthography, and morphology, which are integral for recognizing and deciphering written words (Lexia, 2023). On the other hand, language comprehension includes various subcomponents such as syntax, semantics, pragmatics, and discourse, all crucial for understanding the meaning conveyed by written language.

The SVR highlights that struggles with any of these subcomponents can hinder overall reading comprehension. Therefore, it underscores the importance of developing both word recognition and language comprehension skills concurrently to support effective reading comprehension (Lexia, 2023). By recognizing the interconnectedness of these skills, educators can design

comprehensive instructional approaches to address the diverse needs of students and facilitate their journey toward proficient reading.

The Scarborough Reading Rope Model

Scarborough's Reading Rope, introduced in 2001, offers a comprehensive perspective on the interconnected nature of various reading skills and how they contribute to fluency (Lexia, 2023). Unlike the Simple View of Reading, Scarborough's model visualizes the intricate process of reading through the metaphor of a rope, with different strands representing distinct components woven together to form skilled reading.

The Reading Rope divides into two main categories: word recognition and language comprehension, mirroring the core concepts of the SVR. Within these categories, there are multiple smaller "strands" representing specific skills essential for proficient reading (Lexia, 2023). These strands are interdependent, emphasizing the integrated nature of reading skills.

The word recognition strand encompasses phonological awareness, decoding, and sight recognition (Lexia, 2023). Decoding, in particular, plays a pivotal role in connecting printed words to their spoken counterparts. It involves understanding the language sound system and grasping concepts such as phonology, orthography, and morphology.

On the other hand, language comprehension involves various components such as background knowledge, vocabulary, language structures, verbal reasoning, and literacy knowledge (Lexia, 2023). While these components differ slightly from those in the SVR, they collectively contribute to understanding language and sentence structures, essential for reading comprehension.

Scarborough's Reading Rope underscores the importance of recognizing and developing all these interconnected skills to foster proficient reading (Lexia, 2023).

By visualizing reading as a complex interweaving of multiple strands, educators can better understand the dynamic process of reading development and tailor instruction to address the diverse needs of students.

Phases of Word-Reading Development

The phases of word-reading development, as outlined by Ehri (1996) and Ehri & Snowling (2004), are crucial in understanding the progression toward fluent reading; these phases represent a developmental continuum rather than distinct stages, each supported by specific instructional strategies (Stewart, 2019). Stewart provides an overview of each phase:

- **Prealphabetic reading:** At this stage, children rely on visual cues to recognize familiar words without fully grasping the concept that letters represent speech sounds. They may recognize words by their overall shape or contextual clues.
- **Partial alphabetic reading and writing:** In this phase, children begin to develop some letter knowledge and phoneme awareness. They may recognize and represent some letter-sounds in words but may not have a complete understanding of sound-symbol correspondences.
- **Full alphabetic reading and writing:** Children in this phase demonstrate phoneme awareness, understand basic sound-symbol correspondences, and can sound out words and spell phonetically. They have a foundational understanding of how letters represent speech sounds.
- **Consolidated alphabetic reading:** At this advanced stage, children have developed a sight vocabulary and employ strategies to decipher unfamiliar words. They may segment words into morphological units and can recognize most words automatically. With word recognition becoming more automatic, readers can focus their attention primarily on comprehension.

These phases illustrate the gradual progression toward fluent word reading and underscore the importance of providing tailored instruction at each stage to support children's literacy development (Stewart).

1.3 How the Brain Learns to Read

In the exploration of how individuals learn to read, this section explores the intricate brain processes involved. Despite the remarkable capacity of the human brain to acquire language, reading does not come naturally; instead, it is an acquired skill that requires specialized cognitive mechanisms. Understanding how reading develops involves deciphering the complex interplay between neural networks, cognitive functions, and environmental influences. This section examines the neurological processes involved in reading, shedding light on what occurs within the brain when individuals engage with written language.

How Reading Develops (Why it's Not Natural)

Contrary to the common belief that learning to read is a natural process, it is, in fact, a complex and learned skill that does not occur spontaneously (Colorado Department of Education [CDE], 2022). While humans are naturally wired for spoken language acquisition, reading and writing are man-made inventions that require explicit instruction and practice. Our brains do not have an innate capacity for reading; instead, the brain adapts and rewires to create neural networks specifically for reading. Researchers explain that the brain "circuitry" has basically been repurposed to recognize printed words. Because of something called brain plasticity, during brain development a range of brain circuits can adapt for new uses. "When we learn a new skill such as reading, we recycle some of our old brain circuits" (as cited in Sedita, 2020).

While immersing children in print-rich environments and fostering a love for reading are valuable, they alone are insufficient for developing the literacy skills necessary for proficient reading. Therefore, it is essential to provide explicit and systematic instruction in reading, along with ample opportunities for practice, to ensure students acquire the foundational skills needed for successful reading (CDE, 2022).

Speaking Vs Reading

When examining the natural progression of language acquisition, it becomes evident that learning to speak is inherently more instinctive than learning to read. Infants begin the journey of language acquisition by absorbing the sounds of their environment and gradually associating those sounds with meanings, a process facilitated by exposure to spoken language and opportunities for interaction (Schwartz & Sparks, 2019). Unlike reading, where explicit instruction is necessary, children do not consciously distinguish individual sound units or phonemes when learning to speak. Instead, they learn "probabilistically," forming connections between sounds and meanings through exposure to language-rich environments (Schwartz & Sparks). Within the first two years of life, typically developing toddlers focus on the most common sounds in their native languages and gradually develop an understanding of speech patterns through practice and interaction.

In contrast to the natural progression of spoken language acquisition, learning to read requires a more deliberate and structured approach (Schwartz & Sparks, 2019). In languages like English or French, which are alphabetic, children must learn how written letters correspond to the sounds that make up spoken words. This process involves recognizing patterns of letter sounds within words and connecting them to their spoken counterparts. Unlike the intuitive association of sounds with meanings in spoken language acquisition, reading development relies on explicit instruction to bridge the gap between oral and written language. Thus,

while children naturally acquire spoken language through exposure and interaction, a child will not learn to read through exposure to an abundance of books; the journey of learning to read necessitates a conscious effort to understand the relationship between written symbols and their corresponding sounds.

Parts of the Brain Involved in Reading

Reading engages multiple regions of the brain rather than being confined to a single specific area, as highlighted by research in neuroscience (Sedita, 2020). Advanced brain imaging techniques, such as Functional Magnetic Resonance Imaging (FMRI), have provided insights into the intricate network of brain circuits involved in the reading process. Experienced readers rely on the integration of various regions, predominantly located in the left hemisphere, to efficiently comprehend written language (as cited in Sedita):

- **Parietal-Temporal Region:**
    - Situated towarda the back of the brain.
    - Facilitates the analysis of written words into their sounds.
    - Aids in word decoding and pronunciation.
- **Occipital-Temporal Region:**
    - Located at the back of the brain.
    - Stores the visual appearance and meaning of words.
    - Enables rapid recognition and comprehension.
    - Crucial for automatic, fluent reading.
- **Frontal Region:**

    - Positioned at the front of the brain.
    - Processes speech sounds.
    - Contributes to both listening and speaking abilities during reading.
- **Temporal Lobe:**
    - Responsible for recognizing and processing auditory stimuli.
    - Active during phonological processing.
    - Critical for early readers.
    - Plays a role in deciphering sound-symbol correspondence.

When individuals read or learn to read, all four regions of the brain mentioned above are engaged, regardless of the language being read. It's important to recognize that these regions do not operate independently; instead, they collaborate extensively throughout the reading process (Sedita). The regions are connected by neural pathways known as "white matter" (Lexia, 2023b). The strength of the signals across the pathways increases with the proficiency of the reader. Thus, reading engages a distributed network of brain regions working in tandem to facilitate the complex cognitive task of decoding and comprehending written language.

1.4 Misconceptions About Reading

Misconceptions about the SoR abound, often leading to confusion and misinformation among educators, parents, and policymakers. Despite decades of research and evidence supporting effective reading instruction practices, misconceptions persist that can hinder efforts to improve literacy outcomes for all students. Below we will explore common misconceptions surrounding the SoR

and how the brain learns to read, and provide clarity on key principles and practices that contribute to successful reading instruction. By addressing these misconceptions head-on, we aim to promote a deeper understanding of evidence-based approaches to reading education and empower stakeholders to make informed decisions that support the literacy development of learners.

Misconception #1: Learning to Read is Natural

This misconception was already discussed above, but must be mentioned under misconceptions because it is such a common one. To quickly reiterate: The act of reading, although a fundamental skill in modern society, is not an innate ability of the human brain. Unlike spoken language, which humans have evolved to acquire naturally over time, reading is a relatively recent cultural development. The delay in the widespread adoption of reading indicates that the human brain did not evolve specifically for this task (Sedita, 2020).

Misconception #2: Kids Will Learn to Read if Given Enough Time

The notion that children will naturally learn to read if given enough time is a common fallacy, often fueled by the belief in "late bloomers" (CDE, 2022). This idea suggests that difficulties in reading will resolve over time as the child matures, leading some to believe that early intervention is unnecessary. However, research has debunked this notion, revealing that waiting for reading skills to develop on their own is not only ineffective but potentially harmful. Studies have consistently shown that skill deficits, rather than developmental delays, are the primary obstacles to reading success (CDE). Longitudinal research has provided evidence supporting the skill deficit theory while discrediting the developmental lag theory. Contrary to popular belief, instances of true "late bloomers" in reading are rare, with most children struggling due to underlying skill deficits that require targeted intervention (CDE).

Misconception #3: SoR Only Focuses on Phonics

The SoR is built upon both the SVR and Scarborough's Rope, and emphasizes the five pillars of reading instruction (CDE, 2022). Phonics receives significant attention in discussions surrounding the SoR due to its crucial role in developing foundational reading skills, and because many literacy programs lack explicit instruction in the area. While word recognition and language comprehension are both essential for proficient reading, inadequate phonics instruction can hinder students' progress. Many existing programs lack sufficient emphasis on phonics, leading to gaps in students' understanding (CDE). Therefore, explicit and systematic phonics instruction is highlighted as a cornerstone of effective reading instruction, ensuring that students receive structured lessons that progressively build upon one another. While vocabulary and comprehension are also vital components of reading, there is generally less debate about their instructional methods compared to phonics. Nonetheless, quality instruction in all aspects of reading remains imperative for fostering successful readers (CDE).

Misconception #4: SoR Doesn't Promote Independent Reading of Rich Lit

The misconception that SoR-aligned practice does not promote independent reading of authentic literature overlooks the comprehensive approach to literacy instruction (CDE, 2022). While the goal of evidence-based reading instruction is to equip students with the skills to read any book independently, it recognizes the need for varied text types in instruction. SoR practice advocates for a balance between authentic literature and instructional texts. Decodable text, designed to reinforce phonetic decoding skills, serves as a temporary tool to build fluency and transition students to more complex authentic literature (CDE). Authentic text, including read-alouds and independent reading materials, is utilized to build vocabulary, background knowledge, and comprehension skills, complementing the systematic instruction provided through decodable text. (CDE, 2022) As students

progress and master decoding skills, authentic text transitions into decodable material, aiding in the development of word recognition and language comprehension (CDE). Throughout their literacy development, students are encouraged to embrace authentic text for pleasure reading, whether independently, through audiobooks, or with the assistance of a peer or educator.

Misconception #5: SoR is Based on a Deficit-Model

Science-based instruction employs data to identify areas of strength and weakness, enabling targeted support; rather than labeling students as incapable, it recognizes that with proper instruction, almost all learners can achieve proficiency in reading (CDE, 2022). This approach benefits all students, maximizing success without the need for intervention. Conversely, programs lacking research basis risk leaving many students behind, perpetuating educational disparities.

Misconception #6: SoR Does Not Account for ELLs

The body of research informing the SoR includes studies conducted worldwide in various languages, encompassing research on ELLs, multilingual learners, and speakers of non-mainstream dialects (CDE, 2022). This extensive research indicates that linguistically diverse students benefit from core reading instruction, such as phonemic awareness, phonics, fluency, vocabulary, and text comprehension. Moreover, incorporating students' home language knowledge, along with additional supports and a focus on oral language proficiency, is crucial for their success (CDE). Adequate assessments help identify individual student needs, allowing for tailored instruction to support linguistic diversity effectively.

Misconception #6A: Three-Cueing is Helpful for ELLs

Relying on this method can hinder rather than facilitate reading development for all students, including those learning English as a second or multiple languages

(CDE, 2022). The three-cueing system encourages students to guess unfamiliar words by using context, structure, and visual cues. While this approach aims to aid comprehension, it often leads to inaccurate guesses and undermines the development of accurate decoding skills. Moreover, ELLs may face additional challenges with this approach due to limited English vocabulary, making accurate guesses even more challenging (CDE). Therefore, instead of relying on the three-cueing system, it is essential for ELLs to develop strong decoding skills to read words accurately and build their English proficiency effectively.

Misconception #7: The SoR Kills the Joy in Reading

The primary goal of SoR practices is to equip students with the necessary skills to enjoy reading independently. Science-based reading instruction aims to foster a love for reading by enabling students to engage with a wide range of texts that interest them (CDE, 2022). Through read-alouds and guided reading sessions, students not only enjoy stories but also build background knowledge and develop comprehension skills, which enhances their overall reading experience.

Research indicates that proficient readers are more likely to find reading enjoyable and engaging, leading to increased motivation and frequency of reading (CDE, 2022). Therefore, rather than detracting from the joy of reading, science-aligned practices lay the foundation for students to derive pleasure and fulfillment from reading independently. Ultimately, literacy skills play a crucial role in fostering a genuine love for stories and reading, highlighting the importance of effective instruction in nurturing this passion.

Misconception #8: The SoR is a program

The SoR is not one program or approach, but rather the entire body of research, spanning decades, about how children best learn to read. As such, various

approaches and programs are BASED on the SoR, but the SoR itself is not one program or one-size-fits-all approach.

1.5 Conclusion

Section 1 illuminates the fundamental concepts and historical context of the SoR. By unraveling the complexities of reading instruction, we explored the cognitive processes that underpin this essential skill. From exploring the evolution of reading methodologies to dissecting the cognitive functions of the brain during reading tasks, we gained invaluable insights into the multifaceted nature of literacy education. Through models such as the Simple View of Reading and the Scarborough Reading Rope, we developed a deeper understanding of the intricate interplay between various components of reading. As we debunked common misconceptions about the SoR, we paved the way for a clearer comprehension of evidence-based reading practices. This foundational exploration sets the stage for further exploration and application of SoR principles in Section 2, which will cover the five pillars of reading instruction and implications for practice.

Section 1 Key Terms

Balanced Literacy Approach - A method of literacy instruction that combines elements of whole language and phonics, emphasizing personalized instruction tailored to individual student needs while nurturing a love for reading.

Decodable Text - Reading material specifically designed to reinforce phonetic decoding skills, aiding in the development of word recognition fluency and language comprehension.

Decoding - The process of translating written symbols (such as letters or letter combinations) into their corresponding sounds, enabling comprehension of written language.

Fluency - The ability to read with accuracy, speed, and expression, encompassing reading at the word, phrase, sentence, and story levels.

Leveled Text - Reading materials categorized into different levels based on factors such as vocabulary complexity, sentence structure, and content difficulty, aiming to provide appropriately challenging texts for readers at various skill levels.

Morphology - The study of the structure and formation of words, including the identification, analysis, and understanding of word parts such as roots, prefixes, and suffixes.

Orthographic Mapping - The process of connecting printed letters to their corresponding sounds and meanings in order to recognize words accurately and efficiently during reading.

Orthography - The conventional spelling system of a language; the set of rules governing the correct way to write words, including spelling patterns, letter-sound correspondences, and word formation.

Phonology - The study of the sound system of a language, including the rules governing the organization and pronunciation of speech sounds within words and across language units.

Scarborough's Reading Rope - A model developed by Hollis Scarborough that illustrates the complex and intertwined nature of reading comprehension, depicting the multiple components and skills involved in proficient reading, such as language comprehension, decoding, fluency, and vocabulary.

Science of Reading (SoR) - The Science of Reading (SoR) refers to a body of research-based knowledge that informs effective literacy instruction, emphasizing explicit and systematic phonics instruction, among other evidence-aligned practices.

Simple View of Reading (SVR) - A theoretical framework proposing that reading comprehension is the product of two primary components: decoding (the ability to translate printed words into spoken language) and language comprehension (the ability to understand the meaning of spoken or written language), suggesting that both skills are necessary for proficient reading.

Whole Language Approach - A method of literacy instruction focusing on meaning-making and context cues, where students learn to read through exposure to whole words and literature, rather than through explicit phonics instruction.

Section 1 Reflection Questions

1. Think about your school's current approach to reading instruction, including curriculum used and suggested strategies. How does it align with the principles of evidence-based reading instruction, and what areas do you think could be improved?
2. Reflect on your students' reading progress throughout the year. How do you track and monitor their growth in decoding skills, fluency, vocabulary, and comprehension?
3. Reflect on your understanding of the Science of Reading. How has this section challenged any preconceptions you may have had about reading instruction?

4. Consider the balance between whole language and phonics instruction in your literacy curriculum. How do you strike a balance between fostering comprehension skills and providing explicit phonics instruction?

5. Consider the implications of neuroscience research on reading development for your instructional practices. How do insights from brain imaging studies inform your approach to teaching reading?

6. Reflect on the role of ongoing professional development in improving literacy instruction. How do you stay informed about the latest research and best practices in reading instruction, and how do you incorporate new knowledge into your teaching?

Section 1 Activities

1. **Analyze Leveled Texts:** Review leveled texts currently available in your classroom or school library, evaluating their appropriateness and alignment with student needs. Consider sourcing additional texts to fill any gaps identified.

2. **Explore Scarborough's Reading Rope Components:** Investigate each component of Scarborough's Reading Rope and reflect on how you can incorporate strategies to strengthen these skills in your teaching practice.

3. **Cross-Curricular Literacy:** Collaborate with colleagues to design a cross-curricular unit integrating structured literacy principles into content areas such as science or social studies, emphasizing vocabulary development and reading comprehension skills.

    - Alternatively, design a literacy lesson that has a heavy focus on a content area like science or social studies.

4. **Differentiated Reading:** Develop a set of differentiated reading materials tailored to students at different levels of reading proficiency, incorporating elements of phonics instruction and comprehension support.
5. **Personal Reflection:** Reflect on personal teaching practices and beliefs about reading instruction, considering insights gained from reading about the Science of Reading and identifying areas for professional growth and development.

Section 2: Five Pillars of Reading Instruction & Implications for Practice

Understanding the foundational elements of reading instruction is paramount for educators seeking to cultivate proficient readers. At the core of effective literacy instruction lie the five pillars of reading, recognized by the National Reading Panel as essential components for nurturing reading proficiency (Lexia, 2023). These pillars—phonemic awareness, phonics, vocabulary, fluency, and comprehension—form the bedrock upon which strong reading skills are built. As educators navigate the landscape of teaching literacy, they recognize the significance of mastering these pillars to unlock their students' potential for success in reading.

Through rigorous research spanning multiple disciplines, evidence-based strategies have emerged, providing educators with valuable tools to scaffold the development of each pillar. In this section, we will engage in a comprehensive exploration of the five pillars of reading instruction, learning their definitions, roles in literacy development, and importance. Moreover, we will examine how the pillars fit into the SoR framework, and the implications on instructional practices, empowering educators to apply these principles effectively in diverse learning environments. Educators will gain insights into how the SoR informs their

instructional decisions and shapes their pedagogical practices, ultimately fostering a generation of proficient readers equipped for academic and lifelong success.

2.1 Five Pillars of Reading Instruction

The five pillars of reading instruction, also referred to as the five pillars of early literacy, are crucial elements identified by the National Reading Panel to foster reading proficiency (Lexia, 2023). These pillars encompass phonemic awareness, phonics, vocabulary, fluency, and comprehension, each playing a vital role in the development of strong reading skills. Educators who grasp and adeptly teach these components significantly enhance their students' prospects of achieving proficient reading abilities. Understanding the scientific principles behind these pillars empowers educators to craft instructional approaches that effectively support students in their journey toward becoming proficient readers. In the subsequent sections, we will explore each of these pillar components, exploring how the science of reading informs our comprehension of their importance and implementation.

Phonemic Awareness

Phonemic awareness is a crucial aspect of literacy development, defined as the ability to hear, identify, manipulate, and substitute individual sounds—or phonemes, the smallest units of sound that differentiate meaning—in spoken words (Edmentum, 2023). Importantly, this concept does not rely on students' ability to read or see printed letters; rather, it centers on the sounds produced by word parts. Initially, students learn individual phonemes before progressing to blending phonemes together to form words. Phonemic awareness plays a pivotal role in later reading success by sensitizing students to the alphabetic principle—the idea that letters and combinations of letters represent the speech sounds of a writing system (five from five, 2024).

The significance of phonemic awareness lies in its role as a strong predictor of long-term reading and spelling success (Edmentum, 2023). Students who enter school with robust phonological and phonemic awareness are more likely to become proficient readers. Unlike speech and oral language, phonemic awareness does not always develop naturally and often requires explicit instruction. Weak phonemic awareness skills can hinder the mastery of phonics and may contribute to specific reading disabilities, such as dyslexia. It's been observed that an awareness of phonemes is vital for grasping the logic of the alphabetic principle, emphasizing the necessity of building a basic understanding of the phonemic structure of language (Edmentum).

Furthermore, phonemic awareness remains crucial for older struggling readers, particularly those with phonological-core deficits (five from five, 2024). These deficits, which encompass difficulties with various phonological processes of learning to read, including phonemic awareness, underscore the ongoing importance of phonemic awareness instruction in supporting reading skill development across ages and abilities.

Phonics

Phonics is the understanding of how graphemes (letters) correspond to phonemes (sounds) in language (Lexia, 2023). It entails recognizing the connection between letters and the sounds they represent, which aids in deciphering written words while reading and encoding words while writing. Essentially, phonics instruction equips students with the tools to “crack the code” of reading by establishing connections between sounds and letters or letter combinations, enabling them to construct words (Edmentum, 2023). This phase marks the pivotal moment when students begin to unlock the mechanics of reading.

The significance of phonics lies in its role in empowering students to navigate the complexities of the English language. Despite the language's abundance of

irregular spellings and exceptions to phonetic rules, phonics provides students with a systematic approach to reading words (Edmentum, 2023). By teaching students how to recognize and apply sound-letter relationships, phonics enables them to read, spell, and recognize words with fluency and accuracy. Moreover, mastering phonics facilitates the development of instant word recognition, enhancing students' overall reading proficiency. Ultimately, systematic phonics instruction offers a greater likelihood of success in learning to read proficiently for beginning readers, at-risk readers, disabled readers, and low-achieving readers compared to alternative instructional methods (Lexia, 2023).

What About Irregular Words?

Explicit phonics instruction remains crucial in helping children read irregular words, although additional strategies such as spelling and semantic rules complement this approach (Schwartz & Sparks, 2019). While some words, like "lime" and "dime," follow predictable sound-spelling patterns, others, like "pint" and "mint," demonstrate inconsistent pronunciation despite similar spellings. Brain imaging studies indicate that when encountering such irregularities, readers engage areas of the brain associated with both visual spelling and spoken words, suggesting a reliance on multiple cognitive processes.

Regarding words like "one" and "friend," which don't adhere to traditional sound-spelling patterns, phonics instruction is still relevant but may require additional support. While teaching these words as sight words can be effective, it's essential to also integrate phonics instruction. For instance, in the word "friend," although the "ie" doesn't produce its typical sound, other letters in the word do. Research suggests that children may use recognizable letter combinations, such as "fr" and "nd," as a framework to aid in remembering irregular words like "friend" (Schwartz & Sparks, 2019).

Synthetic Vs Analytic Phonics

Phonics instruction encompasses various methodologies, with two primary approaches being synthetic and analytic phonics (Laura, 2021). Analytic phonics, sometimes called “look-and-say method” or “whole word approach,” focuses on analyzing words and identifying cues to decipher their meaning, with an emphasis on word families. This involves detective-like work, where students look for graphic, syntactic, semantic, and initial sound cues to determine words. Once children identify and understand a word, the focus shifts to letter-sound relationships. Children are prompted to connect the current word with another word they already know as a strategy for identifying words (Mance-Gallagher, 2023).

In contrast, synthetic phonics takes a systematic approach by teaching children the 44 sounds of the English language and introducing them to the different ways these sounds can be represented (Laura, 2021). Rather than focusing on whole words, synthetic phonics emphasizes the sounds of language and teaches the associations between letters and sounds. Children learn to identify and segment individual sounds in words, and then synthesize these sounds to read words. This method prioritizes correct pronunciation of phonemes and emphasizes the process of sounding out words accurately.

Analytic phonics works from whole to part, with children presented with whole words and tasked with analyzing them to derive conclusions about letter-sound relationships (Laura, 2021). For example, children might be shown words like "bat," "bug," "big," and "ball," and asked to recognize that they all begin with the letter "b," indicating that "b" represents the /b/ sound. Conversely, synthetic phonics operates from part to whole, starting with individual sounds (phonemes) and building up to words. Children first segment words into their component sounds and then blend these sounds together to read words.

While analytic phonics places less emphasis on individual sounds and sounding out words, synthetic phonics prioritizes the correct pronunciation of phonemes and the systematic blending of sounds to read words accurately (Laura, 2021). This methodical approach is particularly beneficial for children who may struggle with implicit rules and letter-sound correspondences, as it provides explicit instruction in decoding words.

Studies. Among 38 studies analyzed, synthetic phonics instruction showed higher average effect sizes, indicating that children taught using synthetic phonics generally scored better on reading tests compared to those taught with analytic phonics (Shanahan, 2021). However, this difference was not deemed statistically significant, suggesting that the observed superiority of synthetic phonics could potentially be due to chance rather than a consistent advantage. Subsequent reviews have suggested that synthetic phonics may indeed be superior, but these analyses did not account for important differences, casting doubt on their conclusions. More recently, studies have investigated the effectiveness of synthetic phonics instruction in improving word recognition accuracy among elementary readers. Results indicated that the synthetic phonics approach led to the most significant improvements in word reading skills, with students maintaining these gains on follow-up assessments (Mance-Gallagher, 2023). Empirical research on analytic phonics is limited. In essence, while phonics instruction is beneficial for literacy development, there isn't a clear-cut learning disparity between synthetic and analytic phonics methodologies.

Decodable Text Vs. Leveled Text in Phonics Instruction

Research spanning two decades supports the use of decodable texts as part of a systematic phonics instruction approach (CDE, 2021). These texts provide students with ample practice in decoding words accurately and promoting orthographic mapping. As readers progress and master more complex phonics patterns, the

complexity of decodable texts naturally increases, ensuring continued reinforcement of learned skills. It's crucial to note that while decodable texts are essential for early reading instruction, students should not be limited to them exclusively. Regular exposure to complex texts supports vocabulary growth, background knowledge, and comprehension skills. During guided reading sessions, leveled texts can be effectively utilized to practice various skills under the guidance of the teacher as well (Informed Literacy, 2024). In this controlled setting, the teacher can tailor the text selection to match the instructional level of the students, providing appropriate support and instruction as needed. Leveled texts offer opportunities for students to engage with specific reading strategies, such as decoding, fluency and comprehension, within a supportive environment.

However, caution is warranted when assigning leveled texts for independent reading. These texts lack control over the complexity of language and content, which can pose challenges for struggling readers (Informed Literacy, 2024). Without the guidance of a teacher, struggling readers may continue to reinforce incorrect reading habits, such as guessing or mispronunciation, as they navigate these texts independently. This can impede their progress and hinder their development as proficient readers.

Therefore, it's important for educators to be mindful of how leveled texts are utilized outside of guided reading sessions, and these texts should be accompanied by explicit phonics instruction as well. If independent reading with leveled texts is deemed necessary, additional support mechanisms should be implemented to mitigate potential issues. Providing audio components for students to follow along with the text can help improve comprehension and reinforce correct pronunciation (Informed Literacy, 2024). Additionally, offering decodable texts alongside leveled readers can aid struggling readers in practicing phonetic skills and building foundational reading abilities.

Fluency

Fluency in reading refers to the ability to read text accurately, quickly, and expressively, whether silently or aloud (Edmentum, 2023). It involves reading with a natural flow and rhythm, akin to speaking conversationally. Fluency goes beyond mere word recognition; it involves reading with comprehension and understanding, without the need to pause or decode words extensively.

When students achieve fluency, they can read text as effortlessly as they speak, comprehending the meaning of the material without interruption (Edmentum, 2023). Unlike memorization, which involves repeating text from memory without true reading, fluency is cultivated through repeated and accurate decoding of words. As students engage with text regularly and accurately, they develop the ability to read fluently, enhancing their reading proficiency.

The development of fluency is pivotal for students' motivation to read (Edmentum, 2023). Struggling with decoding letters and words can transform reading into a challenging and tiring endeavor, leading students to view reading negatively. However, as students become more proficient at recognizing words, they should also practice dividing text into meaningful chunks, understanding when to pause, and varying intonation and tone (Edmentum). Through consistent guidance and feedback, students learn to recognize these cues in text, leading to improved comprehension and deeper engagement with reading materials. Thus, fostering fluency is essential for nurturing students' enjoyment of reading and promoting their overall literacy skills.

Reader's Theater can be a powerful tool for enhancing fluency skills in students (Mechelke, 2022). Traditionally, repeated reading involves students reading a text aloud multiple times. Research suggests that this practice, when accompanied by targeted feedback and guidance from a fluent reader, can significantly improve students' word processing speed and their ability to recognize words instantly

(Mechelke). Reader's Theater provides an engaging and motivating way to incorporate repeated reading into the classroom. Instead of simply reading passages independently, students participate in group readings of scripts, rehearsing for a collective performance.

Vocabulary

Vocabulary refers to the collection of words that students understand and utilize in their spoken language (oral vocabulary) and recognize in written text (reading vocabulary) (Edmentum, 2023). It encompasses the words individuals are familiar with and can employ in everyday communication and reading comprehension.

Vocabulary plays a crucial role in reading comprehension, as understanding the meaning of words is essential for making sense of written text (Edmentum, 2023). Words can be acquired through both oral and print contexts, with everyday conversations, reading aloud, and independent reading serving as primary sources for vocabulary acquisition. Research indicates a direct correlation between the quantity of words children hear spoken at home and their proficiency in reading by the 3rd grade, highlighting the significance of continuous exposure to language in vocabulary development (Edmentum).

For beginning readers, oral vocabulary serves as a foundation for comprehending printed words (Edmentum, 2023). When encountering unfamiliar words in text, students rely on their oral vocabulary to decipher meaning. However, encountering unfamiliar words can temporarily disrupt reading fluency until the new word is assimilated into the reader's mental lexicon.

Direct instruction of vocabulary, coupled with word-learning strategies (e.g. dictionary use, analyzing word parts, semantic mapping, and contextual analysis), is essential for expanding students' vocabulary and enhancing reading fluency and comprehension (Edmentum, 2023). Explicitly teaching vocabulary words and

providing strategies for understanding unfamiliar words encountered in text can empower students to become proficient readers. By actively building their vocabulary knowledge, students can improve their ability to comprehend and engage with a wide range of texts, contributing to overall reading success.

Comprehension

Comprehension is the ability to understand, remember, and derive meaning from what is read, serving as the primary purpose for engaging in reading (Edmentum, 2023). Students with well-developed comprehension skills can engage in prediction, inference, making connections, and analysis while reading.

Edmentum (2023) uses the analogy of a watering can: The preceding pillars of reading instruction represent the different components of the watering can—the handle, spout, and body—while comprehension is the water itself. Without the water, you would still have a watering can but it will not allow the flowers to grow. Thus, without comprehension, the reading process remains incomplete. Comprehension infuses meaning and purpose into the act of reading, allowing the blossoming of literacy skills.

Effective comprehension entails more than just understanding the literal meaning of text; it involves active engagement and critical thinking (Edmentum, 2023). Even before becoming independent readers, children can begin practicing and developing comprehension skills through read-aloud sessions. Students proficient in comprehension approach reading purposefully and actively, employing metacognitive strategies to assess the purpose of their reading and monitor their understanding as they progress.

These skilled readers can identify areas where they lack comprehension and articulate them, enabling them to apply specific strategies to enhance their understanding (Edmentum, 2023). Through the cultivation of comprehension

skills, students not only grasp the content of what they read but also develop the capacity for deeper analysis and synthesis of information. Thus, comprehension is foundational to effective reading and fosters the growth of literacy skills essential for academic success.

2.2 Applying the SoR in Instructional Practices

As educators strive to nurture the intricate neural mechanisms necessary for proficient reading, it becomes imperative to know the evidence-based principles that underpin effective instructional practices. Recognizing that reading is not an innate skill, educators must equip themselves with strategies rooted in the SoR to facilitate comprehensive literacy development among learners. This section explores the implications of SoR in instructional practices, elucidating how these principles can inform and enhance teaching methodologies for optimal reading outcomes.

Components of an SoR Approach

Explicit & Systematic

The SoR emphasizes the explicit and systematic instruction of phonics, and as individuals learn to decode words, they also engage with “rich stories and texts that build their background knowledge” (as cited in Hardison, 2023). Over time, teachers assist students in integrating these skills, likening it to weaving strands into a rope, enabling them to tackle more advanced texts with ease. By teaching these components deliberately and clearly, educators help students build strong foundations for recognizing sight words and decoding text.

Explicit instruction begins with clear objectives, allowing students to understand why they are learning what they are learning, and direct teaching, progressing to guided practice with a gradual release model (i.e. I do-we do-you do) (Stewart,

2019). With explicit instruction, the objectives, materials, and lessons are both clear and intentional. On the other hand, systematic instruction ensures a structured progression of skills, moving from simpler to more complex concepts, and including regular review sessions. This organized approach leaves nothing to chance and ensures that all students receive a comprehensive phonics education, setting them up for reading success (Stewart, 2019).

Engaging

Instruction should engage students by ensuring they grasp the significance of the learning activities, experience gradual progress toward success, and encounter connections between the curriculum and their own experiences, emphasizing the importance of background knowledge (Stewart, 2019). When students perceive learning as meaningful to their lives, they become more actively engaged in the educational process. This enthusiasm for learning and willingness to participate fosters deeper understanding and retention of knowledge. Research underscores the importance of engaging instruction in enhancing student learning outcomes (Stewart).

Background Knowledge for Engagement & Understanding. Background knowledge plays a crucial role in facilitating understanding and engagement with text (Schwartz, 2023b). This is evident in studies demonstrating that children comprehend text more effectively when they possess prior knowledge related to the topic being discussed. For instance, familiarity with concepts such as "fossil" and "extinction" enhances comprehension when reading about paleontologists and extinct animal species (Schwartz).

This phenomenon holds true even for students who may struggle with reading overall, as evidenced by studies like the "baseball study" conducted by Recht and Leslie in 1988 (Schwartz, 2023b). In this study, students with limited general reading abilities but extensive knowledge about baseball demonstrated better

comprehension and recall of a passage about the sport compared to higher-scoring peers with less knowledge about baseball.

Moreover, research indicates a correlation between overall general knowledge and reading comprehension proficiency (Schwartz, 2023b). Children with higher scores on tests measuring general knowledge tend to exhibit stronger reading comprehension skills and experience greater growth in comprehension over time (as cited in Schwartz). However, it's essential to consider other factors influencing this correlation, such as language ability and socioeconomic background.

Connect Content Knowledge & Reading Instruction. Connecting content knowledge to literacy instruction can be highly beneficial for students' overall reading comprehension and retention of subject matter (Schwartz, 2023b). One effective approach involves integrating literacy instruction into subjects like social studies and science, which teaches students cognitive strategies to engage with the content. Research by Hwang, Cabell, and Joyner in 2022 demonstrated that this integrated approach not only improved students' understanding of content but also enhanced their vocabulary retention and performance on standardized tests of reading comprehension (Schwartz). Moreover, such programs fostered deeper learning about concepts rather than merely memorizing facts.

Alternatively, incorporating content-rich curriculum into English/language arts units can deepen students' understanding of various topics (Schwartz, 2023b). However, the effectiveness of this approach in enhancing general reading comprehension varies across studies. While some approaches lead to increased subject knowledge and improved performance on reading comprehension tests, others yield mixed results. The Model of Reading Engagement (MORE), developed by Harvard education professor James Kim and colleagues, exemplifies a successful approach that integrates literacy lessons to build science content knowledge (Schwartz). This model focuses on developing students' schemas,

mental models that aid in understanding related concepts. Kim's research emphasizes the importance of deep learning about concepts rather than rote memorization of facts. However, it's crucial to note that students may struggle to transfer learned knowledge to new contexts without explicit connections, signaling areas where additional instruction may be necessary (Schwartz, 2023b).

Comprehension Strategies. Is background knowledge the sole determinant of reading comprehension proficiency? Certainly not. Beyond acquiring information, children must also possess the ability to organize, utilize, and apply that knowledge in various contexts (Schwartz, 2023b). Teaching comprehension strategies aids students in developing these essential skills. Extensive research demonstrates that explicitly instructing students on strategies such as summarization, visualization, creating graphic organizers, and questioning enhances their reading abilities (Schwartz). Furthermore, instructing students on the structural organization of different text types has been shown to bolster reading comprehension. Nell Duke, Executive Director of the Center for Early Literacy Success at Stand for Children, emphasizes the importance of adopting a comprehensive approach that incorporates both content knowledge and comprehension strategies (Schwartz).

Intensive

Effective instruction according to the SoR is intensive, focusing on essential skills and ensuring that all students receive high-quality, evidence-aligned instruction (Stewart, 2019). This intensive instruction is data-driven, meaning that educators use assessment data to tailor instruction to meet students' needs effectively. Moreover, SoR instruction emphasizes early identification of students at risk for reading difficulties, enabling timely intervention to address their specific needs. Early intervention is crucial as it allows educators to provide targeted instruction to struggling readers, continuously monitoring their progress and adjusting

instruction as needed. By intervening early and providing intensive, targeted instruction, educators can effectively support students in developing essential reading skills and prevent long-term reading difficulties.

Focus on Early Instruction

Quality early instruction is key. Research underscores the significance of a prevention-oriented approach, highlighting that effective early instruction can mitigate the devastating educational, social, and emotional consequences associated with reading failure (Stewart, 2019). Studies demonstrate that students who acquire basic reading skills early in their school careers are more likely to achieve higher levels of literacy. While older students with reading difficulties can improve with intervention, delaying intervention prolongs the process, and the effects of remedial instruction may diminish over time (Stewart). Therefore, early and effective instruction is critical for laying a strong foundation for reading proficiency and preventing long-term reading difficulties.

How Structured Literacy Fits into the SoR

Structured Literacy, named by the International Dyslexia Association (IDA) and backed by the SoR, refers to a comprehensive approach to literacy instruction that focuses on teaching language structure explicitly and systematically (Lexia, 2023). Like the SoR, Structured Literacy is NOT a specific program, but rather an approach to teaching children to read. Unlike other commonly used approaches, which may rely heavily on rote memorization and guessing, Structured Literacy emphasizes the underlying structure of language, including phonology, morphology, syntax, and semantics. By breaking down language into its component parts and teaching these elements explicitly, Structured Literacy aims to provide students with a solid foundation for reading, writing, and spelling. This approach is beneficial for all students, but it is particularly beneficial for students with dyslexia or other language-based learning differences, as it addresses the root causes of reading

difficulties and provides targeted instruction to meet individual needs (Lexia). Structured Literacy programs have the following characteristics in common (Lexia):

- **Explicit:** Educators directly teach and practice concepts and skills rather than relying on students learning through exposure alone. This approach ensures that students receive clear guidance and ample opportunities to practice new literacy concepts. Highly explicit instruction is provided not only in foundational skills like decoding and spelling but also in more advanced aspects of literacy such as syntax, reading comprehension, and text composition (IDA, 2019). Immediate feedback is provided to correct any misunderstandings and minimize the risk of practicing incorrect strategies (Lexia).
    - **Modeling and Explanation:** Instructional tasks are carefully modeled and clearly explained, especially during initial introductions or when students encounter difficulties (IDA).
- **Systematic & Cumulative:** Each concept builds upon the previous one in a logical and ordered manner. Teachers carefully explain how each new lesson connects to prior knowledge, allowing students to see the progression of their learning. This approach enables students to develop automatic reading skills gradually, moving from basic to more complex concepts. By systematically building upon foundational skills, students can transition from learning to read to reading to learn (Lexia).
    - **Multiple Practice Opportunities:** Students are provided with multiple opportunities to practice instructional tasks, allowing for skill consolidation and mastery (IDA).

- **Hands-on, Engaging, & Multimodal:** Instruction is hands-on, engaging, and multimodal, recognizing that students thrive when actively involved in the learning process. This approach combines various modalities such as listening, speaking, reading, and writing to cater to diverse learning styles and preferences. By integrating multiple modes of learning, structured literacy promotes language comprehension skills and fosters a deeper understanding of concepts. The goal is to create interactive and engaging learning experiences that enhance students' comprehension and retention of literacy skills (Lexia).
    - **Meaningful Language Interactions:** Lessons incorporate meaningful interactions with language, fostering comprehension and engagement with textual content (IDA).
    - **Encouragement of Student Effort:** Students are encouraged to exert effort and actively participate in learning activities, fostering a positive academic environment.
- **Diagnostic & Responsive:** Instruction is diagnostic and responsive, meaning educators are attuned to the individual needs of each student. Assessments are used to identify particular skills that require attention for individual students (IDA). Interventions should then be tailored to the specific needs of students, with a higher level of intensity—such as smaller group sizes and increased intervention time—allocated to those who are significantly lagging behind their peers.
    - **Monitoring and Scaffolding:** Lesson engagement during teacher-led instruction is closely monitored and scaffolded to support student learning. Similarly, engagement during independent work is monitored and facilitated.

- **Criterion-Based Advancement:** Students must successfully complete activities at a high criterion level of performance before moving on to more advanced skills, ensuring mastery before progression.

The focus of Structured literacy instruction is teaching the fundamental skill components identified by prominent literacy models such as the National Reading Panel, the Simple View of Reading, and Scarborough's Reading Rope. Structured Literacy encompasses various intervention programs and methods, including well-known approaches such as the Wilson Reading System, the Lindamood Phoneme Sequencing Program (LiPS), Direct Instruction, the Orton-Gillingham method (discussed in more detail below), among others (IDA). These programs fall under the umbrella of Structured Literacy and share the common goal of providing systematic and explicit instruction to support students' literacy development.

Students with Disabilities and English Learners

Structured literacy approaches are highly effective for students with disabilities and English Learners (ELs), providing tailored support to address their specific needs (IDA, 2019). For students with dyslexia, who often struggle with phonemic awareness and phonological processing skills, structured literacy interventions prioritize these areas. By emphasizing explicit instruction in phonemic awareness and phonics, these interventions help students with dyslexia build essential foundational skills for reading and spelling. Additionally, for students with co-occurring disabilities such as ADHD, structured literacy programs may incorporate explicit teaching of organizational strategies to support academic tasks (IDA).

Moreover, students with broad language disabilities require interventions that address various language domains beyond phonology, including semantics and syntax (IDA, 2019). Structured literacy interventions for these students address higher-level language areas in addition to phonemic awareness and phonics instruction. By providing comprehensive language support, structured literacy

approaches help students develop robust language skills essential for reading comprehension and academic success.

For ELs, structured literacy instruction offers targeted support to attend to weaknesses in English academic language and vocabulary knowledge, which may arise due to limited exposure rather than disabilities (IDA, 2019). These interventions place an additional emphasis on vocabulary and language instruction, ensuring that ELs receive the necessary support to develop proficiency in English language skills. However, it's important to recognize that some ELs may also have disabilities, requiring adjustments in interventions to address both language acquisition needs and specific learning difficulties. For instance, ELs with dyslexia may benefit from systematic intervention in phonemic awareness and phonics, along with targeted instruction to address gaps in English vocabulary knowledge.

Overall, structured literacy approaches provide flexible and individualized support to meet the diverse needs of students with disabilities and ELs, facilitating their literacy development and academic achievement (IDA, 2019).

Research. Structured Literacy has garnered support from research studies. A study featured in the *Journal of Research on Educational Effectiveness* examined the impact of various instructional strategies on 150 early elementary school students requiring reading support; the students were divided into three groups: Structured Literacy, Guided Reading, and typical classroom instruction (Lexia, 2019). The results revealed that the Structured Literacy approach, with its emphasis on explicit, skill-building instruction, notably benefited struggling students, particularly in comprehension. Participants in the Explicit Intervention group demonstrated nearly four times the gains in comprehension compared to those in the Guided Reading group (Lexia). Additionally, a comprehensive three-year study comparing Balanced Literacy and Structured Literacy approaches

highlighted the efficacy of the Structured Literacy method. The findings indicated that class-wide implementation of Structured Literacy yielded results comparable to costly one-on-one interventions, even for students with reading disabilities (Lexia). These research findings provide promising evidence for the effectiveness of Structured Literacy in improving reading outcomes for diverse student populations.

Orton Gillingham Review and Research. Orton Gillingham, endorsed by the Institute for Multi-Sensory Education, has gained recognition for its effectiveness as a structured literacy approach, originally designed for children with dyslexia but now widely used across diverse student populations (Heubeck & Borowski, 2023). This approach aligns with the five essential components of evidence-based literacy instruction outlined by national panels, emphasizing the teaching of phonemic awareness, systematic phonics, fluency, vocabulary, and comprehension. What distinguishes Orton-Gillingham is its multisensory methodology, integrating sight, hearing, touch, and movement to facilitate the connection between language and written symbols for students, enhancing their learning experience and comprehension.

In Orton-Gillingham instruction, the incorporation of multisensory experiences is a fundamental aspect of every lesson. This approach actively engages multiple senses, including sight, hearing, touch, and movement, to immerse students in the learning process (Heubeck & Borowski, 2023). Whether focusing on decoding or encoding words, students utilize various sensory channels by seeing, speaking, sounding out, and writing letters. According to proponents of the Orton-Gillingham method, this multisensory approach floods the brain with diverse information, enhancing the likelihood of retention and comprehension (Heubeck & Borowski). Throughout the lessons, students may engage in activities such as tapping fingers, writing on textured surfaces like sand or whipped cream-filled paper plates, or using tactile cues to identify different sounds. This sensory-rich

environment not only reinforces repetition and automaticity but also adds an element of enjoyment and playfulness to learning, making it more appealing to students.

While Orton-Gillingham has a long history dating back to its development in the 1930s by Samuel T. Orton and Anna Gillingham, research on its effectiveness remains limited (Heubeck & Borowski, 2023). Initially designed as an intervention for students with dyslexia and related reading difficulties, its efficacy compared to other reading interventions has been subject to analysis. Early meta-analyses yielded inconclusive results due to insufficient research, but a more recent analysis in 2021 suggested promising outcomes, although not statistically significant (Heubeck & Borowski).

Despite the lack of definitive evidence from research studies, educators who implement the Orton-Gillingham method with fidelity often report positive outcomes (Heubeck & Borowski, 2023). For example, Mountain Mahogany Community School saw a significant improvement in reading proficiency scores upon implementing Orton-Gillingham, with a 30 percent increase compared to previous years (Heubeck & Borowski). According to Scott, a proponent of the method, once students grasp the foundational skills provided by Orton-Gillingham, they gain confidence and readiness to tackle more complex reading and writing tasks, fostering a sense of empowerment and academic success (Heubeck & Borowski).

2.3 Conclusion

The foundational elements of reading instruction, encapsulated by the five pillars—phonemic awareness, phonics, vocabulary, fluency, and comprehension—are indispensable for educators committed to fostering proficient readers. Recognized by the National Reading Panel as essential components, these pillars serve as the

bedrock upon which strong reading skills are cultivated. Through rigorous research spanning cognitive psychology, linguistics, and neuroscience, evidence-based strategies have emerged, equipping educators with valuable tools to scaffold the development of each pillar. In this section, we have explored the definitions, roles, and importance of these pillars in literacy development, while also exploring their integration within the Science of Reading (SoR) framework. By understanding how the SoR informs instructional practices, educators are empowered to apply these principles effectively in diverse learning environments. Through this holistic approach, educators can nurture a generation of proficient readers poised for academic and lifelong success.

Section 2 Key Terms

Analytic Phonics - A phonics approach where students analyze whole words to infer letter sounds.

Comprehension - The ability to understand, remember, and derive meaning from what is read, serving as the primary purpose for engaging in reading.

Fluency - Fluency in reading refers to the ability to read text accurately, quickly, and expressively, whether silently or aloud, entailing reading with a natural flow and rhythm.

Orton-Gillingham Approach - A multisensory phonics method designed to teach reading, writing, and spelling skills, particularly for individuals with dyslexia, by integrating sight, hearing, touch, and movement in lessons.

Phonemic Awareness - Phonemic awareness is the ability to hear, identify, manipulate, and substitute individual sounds—or phonemes, in spoken words, regardless of seeing printed letters.

Phonics - Phonics is the understanding of how graphemes (letters) correspond to phonemes (sounds) in language, aiding in deciphering written words while reading and encoding words while writing.

Structured Literacy - Structured Literacy is a comprehensive approach to literacy instruction that focuses on teaching language structure explicitly and systematically, addressing phonology, morphology, syntax, and semantics.

Synthetic Phonics - A phonics approach where students blend letter sounds to read words.

Vocabulary - Vocabulary refers to the collection of words that students understand and utilize in their spoken language as well as recognize in written text, playing a crucial role in reading comprehension.

Section 2 Reflection Questions

1. Evaluate the alignment of your reading instruction with research-based practices. How do you ensure that your teaching methods are grounded in evidence and aligned with the principles of effective literacy instruction?
2. Analyze your assessment practices related to reading instruction. How do you use assessment data to inform your instructional decisions and tailor interventions to meet students' individual needs?
3. Consider the role of comprehension strategies in your teaching. How do you explicitly teach strategies such as summarization, visualization, and questioning to help students improve their understanding of texts?
4. Evaluate the focus on early instruction in your teaching practice. How do you prioritize prevention-oriented approaches to mitigate the

consequences of reading failure? Are there any additional resources or interventions you could implement to support early literacy development?

5. Reflect on your use of structured literacy approaches in the classroom. How do you integrate multisensory experiences and explicit instruction to help students grasp language structure and improve reading skills?
6. Reflect on the impact of engaging instruction on student learning outcomes. How do you foster student engagement in reading activities?
7. Consider the benefits of integrating content knowledge into literacy instruction. How do you connect reading instruction to other subject areas to deepen students' understanding?
8. Consider how structured literacy approaches align with your teaching philosophy. In what ways could you incorporate elements of structured literacy into your current practices?

Section 2 Activities

1. **Curriculum Alignment Analysis:** Analyze your current curriculum materials to assess how well they align with the principles of the Science of Reading (SoR). Identify any areas where adjustments may be needed to ensure alignment with evidence-based practices.
2. **Data Review:** Review student fluency, decoding, or comprehension data collected over a period of time and identify trends or patterns. Use this information to adjust instruction and provide targeted support to students who may be struggling with any of these areas.
3. **Phonics Scope and Sequence Review:** Review the scope and sequence of phonics instruction in your curriculum to determine if it follows a systematic

and explicit approach recommended by the SoR. Identify any gaps or inconsistencies and develop a plan to address them.

4. **Reading Comprehension Strategy Mini-Lessons:** Create a series of mini-lessons on different reading comprehension strategies and deliver them to your students, providing opportunities for guided practice and reflection.

5. **Vocabulary Observation:** Observe a vocabulary lesson in another teacher's classroom and take note of instructional strategies and student engagement levels. Alternatively, record one of your own lessons. Reflect on how you can incorporate effective practices into your own teaching.

6. **Peer Observation Exchange:** Partner with a colleague to observe each other's reading instruction sessions, focusing on how well SoR principles are implemented. Provide constructive feedback and discuss strategies for improvement based on the observation findings.

7. **Literacy Resource Audit:** Conduct an audit of the literacy resources available in your school or district, including textbooks, supplementary materials, and technology tools. Evaluate their alignment with SoR principles and make recommendations for updates or additions as needed.

8. **Student Work Analysis:** Collect samples of student work from various reading activities and analyze them to assess how well students are applying phonics skills, vocabulary knowledge, and comprehension strategies. Use this analysis to inform your instructional decisions and provide targeted support where needed.

9. **Lesson Plan Revision:** Choose a recent lesson plan and revise it to incorporate more explicit and systematic instruction in phonics, vocabulary development, or comprehension strategies, aligning it more closely with

SoR principles. Reflect on the changes made and the potential impact on student learning.

Conclusion

"Introduction to the Science of Reading" has been a comprehensive journey through the foundational principles and practical strategies of evidence-based reading instruction. We began by looking into the historical context and neurological underpinnings of reading, dissecting common misconceptions along the way. In Section 2, we explored the key components of science-based reading instruction, including phonemic awareness, phonics, fluency, vocabulary, and comprehension, guided by models like the Simple View of Reading and Scarborough's Reading Rope. Finally, we bridged theory with practice, equipping educators with tools like Structured Literacy to implement SoR principles effectively in their classrooms. Our goal has been to empower educators as agents of change in the literacy landscape, fostering not only improved reading outcomes but also a lifelong love for learning in their students. As you continue your journey, may you embrace the science of reading and its transformative potential in shaping the future of education.

Classroom Example

Mrs. Teff is a dedicated second-grade teacher with a passion for fostering a love of reading in her students. For years, she has faithfully implemented a Balanced Literacy approach in her classroom, believing it to be the best way to meet the diverse needs of her students. However, despite her efforts, she has noticed minimal gains in her students' reading abilities, particularly in areas such as decoding and fluency.

In her classroom, Mrs. Teff typically starts her literacy block with a whole-group reading lesson, sometimes on word patterns and sometimes on comprehension skills, followed by small group activities and independent reading time. She incorporates a variety of reading materials, including leveled readers, whole-class novels, and student-selected texts. She also focuses on building reading comprehension skills through discussions and activities centered around the text.

Despite her best intentions, Mrs. Teff has become increasingly frustrated with the lack of progress she sees in many of her students. Some continue to struggle with decoding unfamiliar words, while others have difficulty with fluency and comprehension. She worries that her instructional approaches may not be effectively meeting the needs of all learners, and she is looking forward to exploring new practices.

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