~ Chapter 6

The Science of Reading: An Analysis of Texas Literacy Standards for Teacher Certification

Jodi Pilgrim, PhD
University of Mary Hardin - Baylor

Abstract

The "Science of Reading" (SOR) has gained traction due to public media, resulting in a nationwide prioritization of teacher training and changes in the way reading is taught. The nationwide emphasis on the SOR led to new teacher certification requirements in Texas. Although teacher candidates already take a content exam to demonstrate proficiency in English Language Arts and Reading (ELAR) Standards, a new "Science of Teaching Reading" (STR) exam has been added to certification requirements. The purpose of this manuscript is to examine SOR's impact on the Texas ELAR and STR standards and certification exams in order to determine how literacy skills have been categorized by the Texas Education Agency.

Keywords: *STAAR, Science of teaching reading (STR), assessment*

According to the Hechinger Report, 18 states and the District of Columbia have prioritized teaching training and have initiated changes in the way reading is taught (Samuels, 2021). These changes most likely came about as a result of nation-wide critiques of teachers' knowledge of how to teach reading and the institutions that prepare them to teach reading (Hindman, et al., 2020; Hurford, 2020; Moats, 2020; Wexler, 2018). Over the past several years, the "Science of Reading" (SOR) has gained traction due to public media. Stakeholders have the attention of policy makers, who have initiated legislation geared toward literacy instruction for in-service and preservice teachers. The nationwide emphasis on the SOR led to new teacher certification requirements in Texas. Although teacher candidates already take a content exam to demonstrate proficiency in English Language Arts and Reading (ELAR) Standards, a new "Science of Teaching Reading" (STR) exam has been added to certification requirements. The content of this manuscript was shared in a session of the 2022 TALE conference, which celebrated "A Decade of Literacy, Service, and Advocacy." This TALE presentation continued the theme of advocacy with a critical examination of TEA's focus on the Science of Teaching Reading. The purpose of this

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manuscript is to examine SOR's impact on the Texas ELAR and STR standards and certification exams in order to determine how literacy skills have been categorized by the Texas Education Agency.

The Science of Reading

According to the annual "What's Hot" survey, the "Science of Teaching Reading" topic received a ranking of "extremely hot" for 2021, meaning 100% of survey participants agreed that the topic received substantial attention for the year. STR also ranked as the hottest topic in 2020 (Cassidy et al., 2020). Although the label for the topic has changed over the years, the SOR has appeared on the What's Hot list in the past. For example, "scientific reading research and practice" topped the hot list from 2003-2006 (Cassidy & Cassidy, 2002/2003; 2003/2004; 2004/2005; 2005/2006; Cassidy et al., 2020). According to Cassidy et al. (2020), this streak on the hot list evolved from the "Reading First" of the No Child Left Behind Act of 2001, which stressed "scientifically based reading research" (p. 5). Under the title "research-based practice," SOR topped the hot list from 2000-2002 (Cassidy & Cassidy, 1999/ 2000; 2000/2001; 2001/2002), further emphasizing literacy research and effective practices. Goodwin and Jimenez (2020) assert that mainstream media has contributed to how hot the topic is, as well as how polarizing it has become among parents, policymakers, and literacy experts. Shanahan (2020) maintains that the SOR has been used for over 200 years, "used most frequently to refer to the pronunciation and decoding of words on the basis of basic research" (p. S235).

Shanahan, a member of the National Reading Panel (NRP), is not new to the debate between two views, one which places readers' background knowledge and meanings of written words embedded in stories at the center of literacy instruction (Goodman, 2019; Hoover & Gough, 1990; Smith, 1994), and the other which places a high focus on skills-based instruction (Chall, 1967; Flesch, 1986; Moats, 2020; National Institute of Child Health and Human Development, 2000). The NRP also prompted a nationwide focus on research-based practices. The panel, commissioned by Congress in 1997, was tasked with reviewing research on how reading develops, determining the most effective evidence-based methods for teaching children to read, and describing which methods of reading instruction are recommended for classroom use (National Institute of Child Health and Human Development, 2000). The NRP reported that the best approaches to reading include explicit phonemic awareness instruction, systematic phonics instruction, fluency, vocabulary, and comprehension instruction (National Institute of Child Health and Human Development, 2000).

Currently, the SOR has the attention of policy makers, but the focus of policies has been predominantly skills-based instruction related to phonemic awareness and phonics instruction (Gabriel, 2020; Shanahan, 2020). This narrow focus has caused concern for literacy researchers and teachers. In 2020, the editors of *Reading Research Quarterly* issued a call for submissions examining research on the SOR. The response led to the publication of two special issues of the journal related to conceptualizations of the SOR (International Literacy Association, 2020). The editors of *RRQ* note the divisiveness of the stances on SOR (Goodwin & Jiminez, 2020). *RRQ* authors repeatedly noted an oversimplification of the SOR with models like the Simple View of Reading (SVR) (Cervetti et al., 2020; Compton-Lilly et al., 2020; Galloway et al., 2020; Shanahan, 2020;). Compton-Lilly et al. (2020) stated, "In recent years, we have witnessed the dissemination and public acceptance of misinformation related to reading" (p. S185).

The phrase "Science of Teaching Reading" has been used in Texas since January 2015, when the Texas Education Agency (TEA) released a revised version of the ELAR subject exam. The new exam was titled English Language Arts and Reading and the Science of Teaching Reading EC-6. The addition of STR was incorporated in standards for certifying teachers, and "in accordance with the STR" (TEA, 2019, p.

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11-12) was stated at the end of each ELAR competency. In June 2019, the 86th Texas Legislature passed House Bill 3 (HB 3), which required a new, additional certification exam for five fields: EC-3, EC-6, Core Subjects 4-8, 4-8 ELAR, and 4-8 ELAR/Social Studies. In addition, HB 3 requires that all K-3 grade teachers and principals attend a "teacher literacy achievement academy" by the 2022-23 school year. Legislation in Texas mirrors nationwide trends focused on the SOR.

Texas and the Science of Teaching Reading

As Moje (NEPC, 2018) noted, "there will always be people who are going to focus on one portion of what it means to teach and learn to read" (p. 10). The focus in public policy is the "science," but there are varying beliefs about what this means. Advocates of the SOR have invoked the Simple View of Reading (SVR) to prioritize decoding in early reading instruction. Decoding is essential, and TEA has followed this trend, as their 2019 annual report (https://tea.texas.gov/sites/default/files/tea_annual_report_2019_sp2.pdf) states that "science is summarized most easily with the Simple View of Reading" (para. 2). The SVR model suggests that readers who have underdeveloped skills in decoding or language comprehension will struggle with reading comprehension. As seen in Figure 1, the SVR describes comprehension as the product of decoding and language comprehension (Gough & Tunmer, 1986). However, researchers caution against an oversimplification of reading. Cervetti et al. (2020) express concern that even though the original SVR model gave equal footing to decoding and language comprehension, it has been used to ignite public debate and to hyperfocus on decoding and word reading (Cervetti el al., 2020). Silverman et al. (2020) share similar concerns about the minimized emphasis of language comprehension development.

Figure 1. The Simple View of Reading

Another concern is that the SOR neglects the role writing plays in literacy instruction. The reading and writing connection is one of many reasons literacy researchers, theorists, and practitioners have adopted the term literacy to be used instead of reading (Compton-Lily, 2020; Lisenbee, et al., 2020). Graham states that "It is not possible to speak about reading and writing as if they are unrelated. Reading and writing are connected at the most intimate level" (Graham, 2020, p. S37). Although reading and writing each require specific skills, it is theorized that

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what "makes one possible makes the other possible, too" (Graham, 2020, p. S37).

Texas Teacher Certification Test

As previously noted, Texas teacher candidates now take both a content exam to demonstrate proficiency in English Language Arts and Reading (ELAR) Standards and a new, "Science of Teaching Reading" (STR) exam. Developing two sets of standards to represent literacy skills is problematic, especially if the STR standards neglect the reading and writing connection. In order to understand the categorization of the new Texas ELAR and STR standards, it is important to acknowledge the previous set of standards. Table 1 presents an overview of the old and new standards for comparison.

Table 1
Old and New Standards

2019 EC-6 ELAR Standards	New ELAR Standards	New STR Standards
Oral Language	Oral Language	Foundations of the STR
Phonological Awareness	Word Analysis & ID skills	Foundations of Reading Assessment
Alphabetic Principle	Reading Fluency	Oral Language Foundations of Reading Development
Literacy Development	Reading Comprehension & Applications	Phonological and Phonemic Awareness
Word Analysis and ID skills	Vocabulary Development	Print Concepts and Alphabetic Knowledge
Fluency Reading	Reading, Research, & Inquiry	Phonics and Other Word ID Skills
Reading Comprehension & Applications	Writing Conventions	Syllabication and Morphemic Analysis Skills
Vocabulary Development	Written Communication	Reading Fluency
Reading, Research, & Inquiry	Viewing & Representing	Vocabulary Development
Writing Conventions	Assessment of Developing Literacy	Comprehension Development
Written Communication		Comprehension of Literary Texts
Viewing and Representing		Comprehension of Information Texts
Assessment of Developing Literacy		Analysis and Response

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It is important to note that each standard (Table 1), includes a competency statement and a list of descriptive statements which provide in-depth details about the skills required for each competency. The 2019 ELAR Standards, which were retrieved from the Core Subjects Preparation Manual 291 (TEA, 2019a), included the 13 competency statements and 120 descriptive statements. Currently, the ELAR Standards, which were retrieved from the Core Subjects Preparation Manual 391 (TEA, 2020b), include 10 competency statements and 89 descriptive statements. The STR Standards, which were retrieved from the STR Preparation Manual 293 (TEA, 2020a), incorporate a total of 13 competence indicators and 147 descriptive statements. Therefore, the required skills for Texas teacher candidates (EC-6 and 4-8) have increased significantly from 120 to a total of 236 skills to understand.

A Comparison of Standards

A side by side comparison of the previous and current ELAR standards (Table 1) shows that two of the ELAR standards were removed and added to the STR exam. The standards removed included standards 2 and 3: Phonological Awareness and the Alphabetic Principle. When added to the STR standards, Phonological Awareness became Phonological Awareness and Phonemic Awareness, and the Alphabetic Principle became Print Concepts and Alphabetic Knowledge. It is not a surprise that phonological and phonemic awareness skills fall under the STR standards, as these skills are heavily emphasized as the "science."

Table 2 presents changes in the categorization of literacy skills. One additional change included the omission of standard 4, Literacy Development, from the ELAR and STR standards. Competency 4 stated, "The teacher understands that literacy develops over time, progressing from emergent to proficient stages, and uses a variety of approaches to support the development of students' literacy" (TEA, 2019a, p. 12). The skills listed under this omitted competency were extensive and included the following descriptive statements.

The beginning teacher:

A. Understands and promotes students' development of literary response and analysis, including teaching students the elements of literary analysis (e.g., story elements, features of different literary genres) and providing students with opportunities to apply comprehension skills to literature.
B. Understands that the developing reader has a growing awareness of print in the environment, the sounds in spoken words and the uses of print, in accordance with the STR.
C. Selects and uses instructional strategies, materials and activities to assist students in distinguishing letter forms from number forms and text from pictures.
D. Understands the importance of students being able to differentiate words and spaces, first and last letters, left-right progression, and identification of basic punctuation, in accordance with the STR.
E. Understands that literacy development occurs in multiple contexts through reading, writing and the use of oral language.
F. Selects and uses instructional strategies, materials and activities that focus on functions of print and concepts about print, including concepts involving book handling, parts of a book, orientation, directionality and the relationships between written and spoken words, in accordance with the STR.
G. Demonstrates familiarity with literature and provides multiple opportunities for students to listen to, respond to and independently read literature in various genres and to interact with others about literature.
H. Selects and uses appropriate instructional strategies to inform students about authors, authors'

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purposes for writing and author's point of view in a variety of texts.

I. Selects and uses appropriate technology to teach students strategies for selecting books for independent reading.

J. Understands how to foster collaboration with families and with other professionals to promote all students' literacy. TEA, 2019a

Table 2
Categorization of Literacy Skills

Skills that Stayed ELAR competencies	Skills that became STR competencies	Skills Added to STR Standards
Oral Language	Phonological Awareness	Foundations of the STR
Word Analysis & ID skills	Alphabetic Principle (became Print Concepts and Alphabetic Knowledge)	Foundations of Reading Assessment
Fluency Reading (now Reading Fluency)		Oral Language Foundations of Reading Dev.
Reading Comprehension & Applications		Phonological and Phonemic Awareness
Vocabulary Development		Phonics and Other Word ID Skills
Reading, Research, & Inquiry		Syllabication and Morphemic Analysis Skills
Writing Conventions		Reading Fluency
Written Communication		Vocabulary Development
Viewing and Representing		Comprehension Development
Assessment of Developing Literacy		Comprehension of Literary Texts
		Comprehension of Information Texts
		Analysis and Response

Upon a closer analysis, Standard 4, literacy development was not omitted entirely from competencies D and F describe the concepts of print, which are skills added to the STR standards. Competencies G, H, and I were not added elsewhere, which caused initial concern. However, in both the previous and current teacher standards but distributed among other skills in the STR competencies. For example, fluency standards, one can find similar descriptive statements:

> F. Knows how to teach students in grades 4–6 strategies for reading books independently, including the use of

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technology to support grade-level content.

G. Provides students with opportunities to engage in silent reading and extended reading of a wide range of materials, including informational texts and texts from various literary genres, as outlined in the Texas Essential Knowledge and Skills (TEKS) for grades 4–6.

H. Uses strategies to encourage reading for pleasure and lifelong learning.

It may seem that Literary Response and Analysis (A), formerly included under Literacy Development, became its own competency within the STR framework. However, the STR competency titled Analysis and Response (competency 13) differs significantly. Whereas Literary Response and Analysis involved an understanding and promotion of "students' development of literary response and analysis, including teaching students the elements of literary analysis (e.g., story elements, features of different literary genres) and providing students with opportunities to apply comprehension skills to literature," (TEA, 2019a, p. 12), STR competency 13 aligns to the constructed response question on the STR exam. The competency statement indicates that the teacher candidate can "analyze assessment data related to reading development in foundation reading skills and reading comprehension, and prepare an organized, developed written response based on the data and information presented" (TEA, 2020a, p. 18). There are seven competency descriptors that further define the desired teacher skills. The constructed response question, new to Texas teacher certification requirements, requires test-takers to examine data provided in several exhibits and to demonstrate knowledge of the subject area by providing an in-depth written response.

One difference between the former standards and the new standards relates to the inclusion of dyslexia. Knowledge about dyslexia was not included in the 2019 ELAR Standards because the state provided a dyslexia module for all certifiers which was assessed on the Texas Pedagogy and Professional Responsibilities Exam, which is also required for EC-12 certification in Texas. TEA (2020a) added dyslexia to the standard titled Foundations of the STR. Competency descriptor O states that teachers should: "Recognize that decoding-related difficulties and disabilities represent the most common source of reading difficulty; demonstrate knowledge of distinguishing characteristics of dyslexia and dysgraphia, including early indicators of dyslexia and dysgraphia; and demonstrate familiarity with evidence-based instructional strategies and best practices that general education teachers in prekindergarten through grade-3 classrooms can use to help support the literacy development of students with identified delays in decoding and spelling" (p. 5).

Another difference found between the two new sets of standards and competencies is that ELAR standards include skills used for written composition, and STR does not. Written Communication and Writing Conventions are unique to the ELAR content exam, as are Reading, Research, and Inquiry and Viewing and Representing, which both include multimodal learning and technology skills required of learners. Where the ELAR includes comprehensive skills used by readers and writers, the STR standards reflect linguistic skills. Writing skills, other than spelling/encoding, are not included in the STR standards.

STR Data

The STR exam requirement took effect on January 1, 2021. TEA implemented an eight-month introductory period in which they established a cut score to be used as a minimum threshold of items correct in order to pass the exam during a transition period. The transition period ended September 5, 2021. TEA reported a 100% pass rate for the 2021 transition period

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(https://tea4avcastro.tea.state.tx.us/ELQ/educatorprepdatadashboard/indicator1b.html). Since then, recommendations were made by a standard setting committee on the passing standard to be implemented. Data on STR results are not available to the general population at this time. However, educator preparation programs have the ability to monitor and examine their candidates' certification exam passing rates.

Implications and Recommendations

TEA's efforts to improve literacy education are commendable but have added pressure during a post-pandemic era in which a teacher shortage worsens. Adding a certification test for preservice teachers has caused increased costs and time commitments.

Table 3 presents an overview of testing details related to the current required certification exams discussed in this manuscript.

Table 3
Texas Teacher Assessment Details

Exam	Exam Code	Time	# of Questions (selected response)	Cost
Core Subjects ELAR (EC-6)	391	1 hr. 10 min.	45	$58 ($116 if taken with other subjects included)
STR	293	5 hours	90 *also includes 1 constructed response	$136
PPR (EC-12)	160	5 hours	100	$116

TEA committed to the SOR with added standards and assessment. However, one may argue that teacher educators were already addressing the "science" prior to Texas legislation within the ELAR standards. According to TEA's The Science of Teaching Reading (293) Questions and Answers manual, the 391 Core, Subjects: EC-6 TExES exam was developed to remove duplicative content now assessed on the 293 STR TExES exam (TEA, 2021). Yet, the standards present on both exams include Word Analysis, Word Identification Skills, Reading Fluency, Vocabulary Development, Comprehension (labels differ), and Assessment. In addition to the overlap observed in the standard titles, overlap occurs in the descriptive statements, which is briefly addressed in this analysis. For example, both the new ELAR and STR exam include competencies related to the needs of English Learners.

Recommendations for TEA and Policy Makers

According to Texas statute (Texas Education Code, § 61.0515), 120 hours is the maximum allowed for a baccalaureate-level degree program (THECB, 2009). In other words, higher education institutions prepare EC-6 teachers to be experts at teaching science, math, social studies, reading, and writing (not to mention technology, classroom management, and other skills) within a 120 hour degree program. Within most teacher preparation programs, this 120 hour limit includes 12 hours of student teaching as well as other field-based experiences. The continuous addition of certification requirements impacts these programs greatly as they work to ensure all standards are covered effectively. In order to better serve teacher candidates, it is recommended that the TEA return to a reasonable assessment of literacy standards. One literacy exam with one set of rigorous literacy standards based on the STR is appropriate. It is also recommended that exam costs be lowered in order to alleviate stress on teacher candidates.

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Teacher candidates who pass the STR examinations are still required to complete the Reading Academies when they start a job as a teacher (TEA, 2021). The Reading Academy requirement of HB 3 is mandated for all in-service teachers and administrators who teach students in grades K-3. However, passing the STR certification exam should satisfy the STR requirement and would save money and time. STR legislation was passed prior to the pandemic and teacher shortage. Now, as teachers work to address learning loss caused by the pandemic, completing a 60-120 hour Reading Academy course has added to teacher frustrations (Lopez, 2022). The frustrations seem unnecessary for those who have already demonstrated knowledge of STR skills on a certification exam.

Recommendations for Teacher Educators

This analysis focuses primarily on standard headings and competency statements. Although some of the descriptive statements have been shared, it is essential that teacher educators become familiar with all of the skills described in these descriptive statements. In addition, educators should be familiar with TEA's Reading Academies and TExES Preparation Manuals. Even though the ELAR and STR have similar objectives, TEA advocates specific models and theories in their training. For example, TEA materials include the Simple View of Reading (Gough & Tunmer, 1986), Scarborough's Reading Rope (Scarborough, 2001), and Ehri's Four Phases of Word Reading. Teaching to the test is not the recommendation; however, it may be appropriate to provide STR study materials so teacher candidates may review the preferred theories, models and specific verbiage. One study source that may be useful to share with teacher candidates is a six video playlist hosted by the TExES Facebook Group in which Dr. Kristy Mulkey breaks down the STR standards and sample questions:

Video 1: https://youtu.be/55_Nv9CE_3Q
Video 2: https://youtu.be/EtpFjw8EWqU
Video 3: https://youtu.be/MgWBIngzX4E
Video 4: https://youtu.be/gtR7PR9hVok
Video 5: https://youtu.be/HCQo2Nq4XJw
Video 6: https://youtu.be/Z88xUN84-R8

Teacher educators should support their candidates' understanding of the constructed response questions as well. It would be helpful to assist candidates in understanding the scoring criteria for the constructed response question through the use of the scoring rubric, sample responses, and rationales shared in the preparation manual.

Finally, it is essential that teacher educators incorporate instruction that demonstrates ways science evolves. Researchers continue to study literacy acquisition. Theories and models evolve. For example, Hoover and Tumner (2020) adapted the Simple View of Reading (Figure 2) by revising the D (decoding) to WR (word recognition). This adaptation reflected a broadened understanding of reading.

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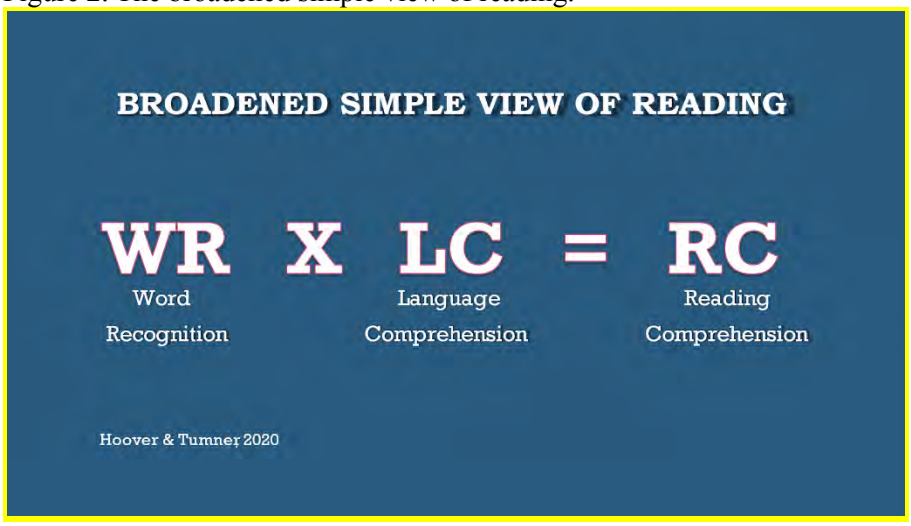
Figure 2. The broadened simple view of reading.



Duke and Cartwright (2021) argue that the Simple View of Reading (SVR) should be replaced with the more complex Active View of Reading (2021) in order to reflect an up-to-date representation of what reading requires and where instruction must be focused. In a recent article, they describe research in three areas of science that have occurred since the SVR model was introduced in 1986. They express concern that the causes of reading difficulties expand beyond that depicted in the SVR and maintain that "many practitioners have not yet been offered other models that can more productively guide their practice" (Duke and Cartwright, 2021, p. 15). Educators must understand the complexities of literacy and literacy instruction.

Concluding Thoughts about the STR

The noted overlap between ELAR and STR standards makes sense because both of these sets of standards describe skills related to literacy instruction. However, overlap across standards means preservice teachers are paying to take two literacy certification tests that cover similar content. Texas is one of many states with new policies related to the SOR. The policies, a result of assumptions that literacy educators were not teaching the "science" prior to the test, have impacted teacher candidates. The media continually publishes claims that "a majority of teachers still haven't been given the knowledge or instruction to effectively teach children to read" (Moats, n.d., para. 7) and that "most teachers nationwide are not being taught reading science in their teacher preparation programs because many deans and faculty in colleges of education either don't know the science or dismiss it" (Hanford, 2018, para. 9). Texas educators express concerns about the current discourse related to the STR. University of Texas professors Wetzel et al. (2020) contributed to the 2020 *RRQ* issue to resist "positionings of struggle in the science of teaching reading discourse" and "the targeting of teachers and teacher educators by policymakers and popular media writers" (p. 319). Chase Young opened the 2022 TALE conference with concerns about the media's representation of the SOR. In his presentation on "Artfully Teaching the Science of Reading," Young bridged SOR with artful approaches to teaching reading, an intentional effort to increase students' motivation and positive attitudes toward reading (Young et al., 2022). It is important that educators continue to explore science, pedagogy, and artful teaching. As literacy educators and researchers, it is essential to advocate for teachers and students.

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