



**Reading Reimagined**

supported by **aerdf**

ROAR White Paper for Decision-Makers

# Addressing Student Literacy in Upper Elementary and Beyond:

**A NEW, INNOVATIVE APPROACH TO  
ASSESSMENT AND INTERVENTION**



Literacy—the ability to read and write effectively—is a fundamental skill crucial for every student’s academic and personal development.

It enables people to express their ideas, opinions, questions, and emotions.

Research shows that student literacy is closely linked to positive outcomes later in life, including:



Increased high school graduation rates<sup>1</sup>



Higher attendance rates<sup>2</sup>



Higher test scores<sup>3</sup>



Higher lifetime earnings<sup>4</sup>



Better physical and mental health<sup>5,6</sup>



# A Closer Look at **Student Literacy** in Upper **Elementary** and Beyond

The recent release of the National Assessment of Educational Progress (NAEP) 2024 results highlights a disturbing reality: Current approaches to literacy education fail to meet the needs of our students. Approximately 70 percent of our fourth and eighth grade students do not meet the NAEP level of proficiency.<sup>7</sup> The problem is worse for Black, Latino/a, and Indigenous students.<sup>8</sup>

These results represent a tremendous loss of human capital and a failure to capitalize on our investments in education. To remedy this, we must ensure that all students acquire the necessary literacy skills to participate successfully in their communities and future endeavors, transforming our education system into a more effective driver of opportunity.

Recent research sheds light on some root causes of student difficulties. Historically, the focus of reading instruction shifts from “learning to read” in early elementary grades to “reading to learn” in upper elementary and beyond. This approach assumes that decoding [= reading] and encoding [= writing/spelling] skills developed in early grades are sufficient to handle the increasingly difficult texts encountered in later schooling, texts which feature more and more multisyllabic words and longer, more complex sentence structures. However, evidence suggests that this is often not the case. A significant portion of students in upper elementary and middle school lack proficient decoding skills to meet the new challenges of their grade-level texts, which impedes their progress in developing other reading skills, like fluency, or in comprehending what they’re trying to read.<sup>9</sup>

Effective support for struggling students and ensuring that all students can achieve their full potential requires that we have precise data identifying their strengths and gaps in more advanced foundational reading skills, such as morphology, as well as supportive instructional materials. Unfortunately, most classrooms do not have either. The simple fact is when it comes to older students’ literacy, schools are teaching the wrong stuff the wrong way and don’t know it. We need to assess and teach differently, especially when helping older students gain reading proficiency.

This paper presents recent research on the factors contributing to reading difficulties in older students, discusses the limitations of existing assessments, and introduces the Rapid Online Assessment of Reading (ROAR), a suite of assessments developed to efficiently and effectively identify the foundational literacy needs, including advanced decoding skills, of students and inform targeted instructional interventions.

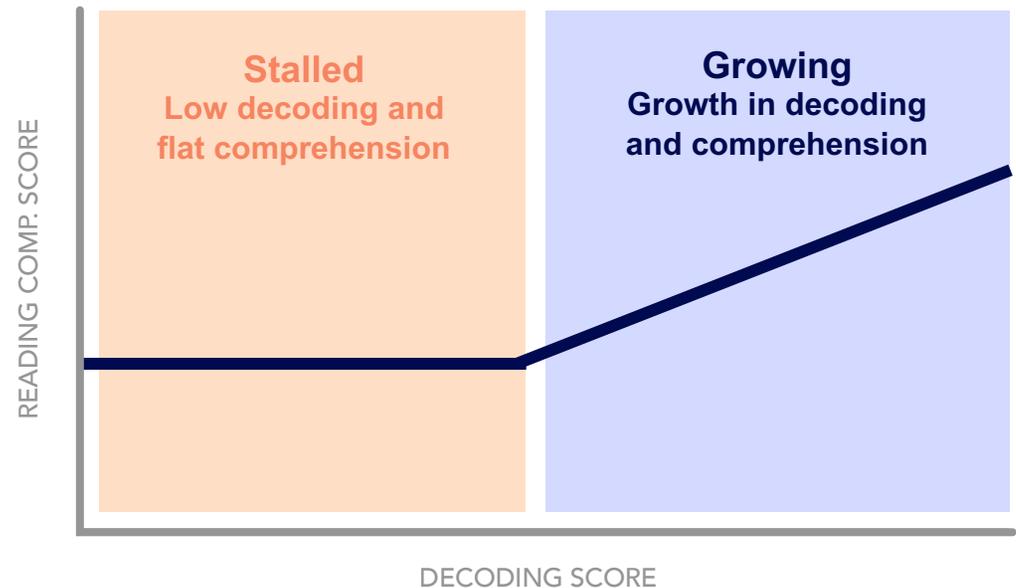
## BIG IDEA 1

# The Decoding Threshold

New research has **identified a key factor affecting reading comprehension in many older students: the “decoding threshold.”** The decoding threshold refers to the point at which students can decode grade-level text accurately and efficiently, **allowing them to independently comprehend these texts.**<sup>10,11</sup>

Students whose decoding skills aren't adequate for the text they're trying to read are much less likely to comprehend the text and are also less likely to gain any benefit from direct instruction that focuses on comprehension.

Figure 1: Graph showing the relationship between students' overall reading comprehension score and their decoding score. Note that below the “decoding threshold,” reading comprehension remains flat.



What this means: Many students only know the decoding rules they learned in early elementary grades, but those decoding rules often don't work with longer, more sophisticated words. Take, for instance, how we are taught to decode “cat.” Many students will attempt to apply those same decoding rules when they come across the same “c-a-t” letter sequence in words like “educator” or “allocation.” These students need additional decoding instruction for multisyllabic words, which are often less common and technical or abstract. Identification of those students who are below the decoding threshold allows us to provide targeted instruction that meets their needs.

## BIG IDEA 2

# Existing Assessments Do Not Measure Comprehensive Foundational Literacy Skills in Older Students

The long-standing belief that students have acquired all of the foundational literacy skills they'll ever need by third grade has created an assessment data gap in upper elementary and middle school, wherein reading comprehension is the only thing students are tested on. When a foundational skills assessment is administered to an older student who's struggling with reading, it is almost always a test of early foundational literacy skills like phonemic awareness, which the student might well already know, rather than the more advanced decoding skills (e.g. multisyllabic words or morphology knowledge) that might be the actual area of need for that student. Taking tests designed for younger students can be demotivating for kids in upper elementary and middle school, and the results shed no light about how their teachers can support them.<sup>12,13</sup> As a result, they cannot identify those students who are below the decoding threshold. In addition, existing foundational literacy assessments are created for younger students and are demotivating when administered to older students.<sup>14</sup>

Not only are traditional literacy assessments demotivating and assessing the wrong things, administering the assessments is onerous, time consuming, and costly. Most require individual administration, meaning that an adult assesses and scores an individual student as the student reads aloud. It is obviously not feasible to assess an entire grade level (or middle school) in a timely manner this way. In some cases, students are assessed by an AI agent, but AI agents have their own issues, notably (a) they have not been trained on youth's voices and so are less reliable than human coders and (b) they require a quiet room with only one student talking at a time, making it impossible to assess an entire grade simultaneously.

Traditional assessments have another obvious, but rarely discussed, flaw: The assessment of students' reading ability is based on their speaking patterns. Scoring of verbal responses is often biased against students with local dialects, multilingual students with accents, students who speak African American Vernacular English, or students with speech impediments.<sup>15,16</sup> To meet the needs of our students and teachers, we need a new type of assessment.

## BIG IDEA 3

# ROAR: Silent, Efficient, and Automated Assessments

To overcome the major obstacles of existing assessments, we need automated assessments of reading that can be administered silently and efficiently in a group setting. ROAR provides such an assessment.

Traditional reading assessments have students read passages aloud (with the problems and biases previously described). However, recent research behind the creation of the ROAR assessment shows that an assessment can instead have students decide whether combinations of letters (a) are words, (b) are not words, or (c) sound like existing words.<sup>17</sup> This approach, called a “lexical decision task,” bypasses the need for students to read aloud and removes the need for human administration. The validity of the assessment depends on careful design and validation of the item bank but allows for a much more efficient approach to assess decoding skills. As a result, ROAR can be administered via computer in a group, assessing an entire class (grade level, or even school) in minutes.

The use of a lexical decision task has other advantages. ROAR can leverage an approach called computer adaptive testing (CAT). ROAR’s CAT uses a student’s past performance, both historical and within the assessment administration, to provide assessment items at the right level of difficulty for that student. This means that students receive assessment items tuned for their precise ability level, allowing the same measure to adapt to a kindergartener who is just beginning to decode words or middle school student who is still struggling with complex spelling patterns and multisyllabic words. CAT has been shown to greatly reduce assessment time, while increasing assessment accuracy.<sup>18</sup>

These innovations not only allow group scoring in a matter of minutes, but they also allow ROAR to provide automated and immediate scoring, without the bias introduced by humans or AI models. This means that the results of an entire class (or grade, school, or district) are available immediately as students complete each measure with the administration. This allows timely action to adjust instruction based on student needs.



## BIG IDEA 4

# ROAR

# Addresses the Full Range of Literacy Assessment Needs

A full understanding of a student's strengths and weaknesses in literacy requires assessments along several dimensions, such as decoding, phonological awareness, reading fluency, morphology, and comprehension. Traditional assessments do not provide all these measures for students in upper elementary and beyond.

ROAR provides a suite of short, efficient assessments that can be used individually or together to provide a holistic view of reading development and provide detailed information on each student.<sup>19</sup> (For a complete list of the ROAR assessment suite, please see <https://roar.stanford.edu/assessments/>.) ROAR has also been validated for use in identifying students with reading difficulties such as dyslexia.<sup>20,21,22</sup>

ROAR is available in both English and Spanish, with other languages in development. This allows students to be assessed in all languages they speak, providing a more comprehensive understanding of their reading skills.<sup>23</sup> For instance, if an assessment indicates that a multilingual student is doing poorly in phonics, it is unclear whether they lack a general understanding of phonics, or whether they are applying phonics rules from their home language to English language texts; ROAR's multilanguage assessment suite is designed with this consideration in mind.

As a result, teachers can better understand student strengths and areas of need, and provide more precise instructional interventions.



DEMOS FOR A WIDE RANGE OF ROAR ASSESSMENTS  
can be found at <https://roar.stanford.edu/assessments/>.

## BIG IDEA 5

# Assessments Must Link to Interventions

ROAR provides detailed, actionable data for teachers and parents.<sup>24</sup> This data can inform instruction, intervention, and progress monitoring. The full suite of validated ROAR measures ensure that students' precise needs are identified and they receive the intervention they need.

ROAR has been designed to be integrated into technology-based learning environments, such as the [Magpie Literacy](#) product. Through this integration, students move seamlessly between assessment and instruction, receiving assessment when further details on student performance are needed and receiving instruction tuned to the needs identified through their assessment. This seamless integration can support a more data-driven and personalized approach to reading instruction.



# Call to Action: Seizing the Opportunity for Literacy Transformation

The data is clear: Our current approaches are leaving too many older students behind in literacy. Current approaches create a systemic barrier to equitable outcomes, higher graduation rates, and future success in college and careers. There is, however, opportunity for strategic leadership to create transformative change.

ROAR offers a powerful, evidence-based path forward, where:

- Precise literacy data is readily available for every student, including older students, allowing for truly targeted interventions.
- Assessment is efficient and equitable, minimizing instructional time lost and eliminating biases that affect multilingual learners and students with diverse speaking patterns.
- Districts are equipped to make data-driven decisions that genuinely move the needle on literacy for all students, especially those who have historically been underserved.

Implementing new solutions in a complex district environment comes with familiar challenges. However, ROAR's design and strategic adoption can transform these into opportunities:

- **Addressing Foundational Literacy Beliefs:** Many educators of older students may not realize the continued need for foundational literacy instruction. District leadership can foster a *data-driven culture*, leveraging ROAR's precise insights into the decoding threshold to demonstrate where foundational skill gaps impede comprehension. Empowering early elementary literacy experts within your district to collaborate with upper-grade teachers can also bridge this understanding.
- **Optimizing the Assessment Landscape:** Instead of adding "just one more assessment," conduct a comprehensive *assessment audit*. ROAR's unparalleled efficiency and actionable data offer a chance to streamline your current assessment battery, potentially replacing burdensome or less informative tools and even *creating* more time for instruction.

- **Allocating Time for Foundational Instruction:** It's imperative to find dedicated time for foundational literacy for older students. Districts successfully do this by integrating technology-enabled, personalized foundational reading support into Tier 1 instruction, or by utilizing existing flexible periods like homeroom or advisory for targeted interventions. As teachers and students see the rapid improvements, the value of this time becomes undeniable.
- **Aligning with Core District Priorities:** Improving foundational literacy in older students isn't an isolated goal; it's a *cross-cutting priority* that significantly impacts achievement in all text-heavy subjects like social studies and science. Prioritizing reinforces a commitment to closing achievement gaps, advancing equity, and ensuring all students are prepared for their futures.

### Embracing this opportunity requires proactive leadership. Leaders can take these key steps today:

#### Initiate an Internal Review:

Convene a leadership team—including curriculum, assessment, and technology directors—to thoroughly review the research and capabilities of ROAR. In parallel, conduct a literacy assessment audit to understand which existing assessments are necessary and which can be replaced by ROAR. Creating a collective understanding is the first step toward informed decision-making.

#### Consider a Targeted Pilot Program:

A strategic pilot in a few schools or specific grade levels, possibly with teachers who are enthusiastic volunteers, allows a district to experience ROAR's impact firsthand. This approach offers an invaluable opportunity to:

- » Gather *district-specific data* on student progress and ROAR's effectiveness.
- » Build *internal expertise* and enthusiasm among educators.
- » Refine implementation strategies tailored to each district's unique context.

#### Develop a Strategic Integration Plan:

Based on insights from the internal review and any pilot, create a roadmap for how ROAR can integrate into existing assessment and instructional frameworks. This includes identifying where ROAR can replace less efficient assessments, optimize resource allocation, and enhance your overall literacy ecosystem.

### Download the ROAR Implementation Guide

A detailed guide to effectively implement ROAR and ensure that all students get the support they need.

# Endnotes

1. Donald J. Hernandez, *Double Jeopardy: How Third-Grade Reading Skills and Poverty Influence High School Graduation* (The Annie E. Casey Foundation, 2011), <https://www.aecf.org/resources/double-jeopardy>.
2. Attendance Works, *Preventing Missed Opportunity: Taking Collective Action to Confront Chronic Absence* (Attendance Works, 2016), <https://www.attendanceworks.org/preventing-missed-opportunity/>.
3. Anne E. Cunningham and Keith E. Stanovich, "Early Reading Acquisition and Its Relation to Reading Experience and Ability 10 Years Later," *Developmental Psychology* 33, no. 6 (1997): 934–945, <https://doi.org/10.1037/0012-1649.33.6.934>.
4. OECD, *Skills Matter: Further Results from the Survey of Adult Skills* (OECD Publishing, 2016), <https://doi.org/10.1787/9789264258051-en>.
5. Darren A. DeWalt et al., "Literacy and Health Outcomes," *Journal of Internal Medicine* 19 (2004): 1228–1239, <https://doi.org/10.1111/j.1525-1497.2004.40153.x>.
6. Kaiulani Shulman et al., "Reading for Life-Long Health," *Frontiers in Pediatrics*, no. 12 (2024): <https://doi.org/10.3389/fped.2024.1401739>.
7. "NAEP Report Card: Reading," The Nation's Report Card, National Center for Education Statistics, [https://www.nationsreportcard.gov/reports/reading/2024/g4\\_8/](https://www.nationsreportcard.gov/reports/reading/2024/g4_8/).
8. "National Achievement-Level Results," The Nation's Report Card, National Center for Education Statistics, <https://www.nationsreportcard.gov/reading/nation/achievement/?grade=4>.
9. Zuowei Wang et al., *Replicating Decoding Threshold in ReadBasix®: Impact on Reading Skills Development*, Research Memorandum No. RM-24-06 (ETS Research Institute, 2024): <https://www.ets.org/research/the-decoding-threshold-measuring-the-roots-of-older-students-reading-difficulties-new-evidence.html>.

10. Wang et al. *Replicating Decoding Threshold in ReadBasix®*
11. "MS/HS Comprehension Prediction," Rapid Online Assessment of Reading (ROAR), Stanford University, <https://roar.stanford.edu/technical/mshs-comprehension.html>.
12. Michael L. Kamil et al. *Improving Adolescent Literacy: Effective Classroom and Intervention Practices. A Practice Guide*, NCEE #2008-4027 (Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education, 2008), [https://ies.ed.gov/ncee/WWC/Docs/PracticeGuide/adlit\\_pg\\_082608.pdf](https://ies.ed.gov/ncee/WWC/Docs/PracticeGuide/adlit_pg_082608.pdf).
13. Anita L. Archer et al., "Decoding and Fluency: Foundation Skills for Struggling Older Readers," *Learning Disability Quarterly* 26, no. 2 (2003): 89–101. <https://doi.org/10.2307/1593592>.
14. David A. Kilpatrick, *Essentials of Assessing, Preventing, and Overcoming Reading Difficulties* (John Wiley & Sons, 2015).
15. "ROAR Vision and Mission," Rapid Online Assessment of Reading (ROAR), Stanford University, <https://roar.stanford.edu/technical/intro.html>.
16. Julie A. Washington and Mark S. Seidenberg, "Teaching Reading to African American Children: When Home and School Language Differ," *American Educator* 45 no. 2 (2021): 26–33, <https://eric.ed.gov/?id=EJ1304333>.
17. Wanjing Anya Ma et al., "ROAR-CAT: Rapid Online Assessment of Reading ability with Computerized Adaptive Testing," *Behavioral Research Methods* 57, no. 56 (2025): <https://doi.org/10.3758/s13428-024-02578-y>.
18. David J. Weiss and G. Gage Kingsbury, "Application of Computerized Adaptive Testing to Educational Problems," *Journal of Educational Measurement* 21, no. 4 (1984): 361–375, <https://doi.org/10.1111/j.1745-3984.1984.tb01040.x>.
19. "ROAR Vision and Mission."
20. Elizabeth Barrington et al., "Rapid Online Assessment of Reading (ROAR): Evaluation of an Online Tool for Screening Reading Skills in a Developmental-Behavioral Pediatrics Clinic," *Journal of Developmental and Behavioral Pediatrics* 44, no. 9 (2023): e604–e610, <https://doi.org/10.1097/DBP.0000000000001226>.
21. Liesbeth Gijbels et al., "Rapid Online Assessment of Reading and Phonological Awareness (ROAR-PA)," *Scientific Reports* 14, no.1 (2024): 1–16, <https://doi.org/10.1038/s41598-024-60834-9>.
22. Ma et al., "ROAR-CAT."
23. "Multilingualism," Rapid Online Assessment of Reading (ROAR), Stanford University, <https://roar.stanford.edu/technical/intro-multilingualism.html>.
24. "ROAR Scores and Norms," Rapid Online Assessment of Reading (ROAR), Stanford University, <https://roar.stanford.edu/technical/intro-norms.html>.



# Reading Reimagined

supported by **äerdf**