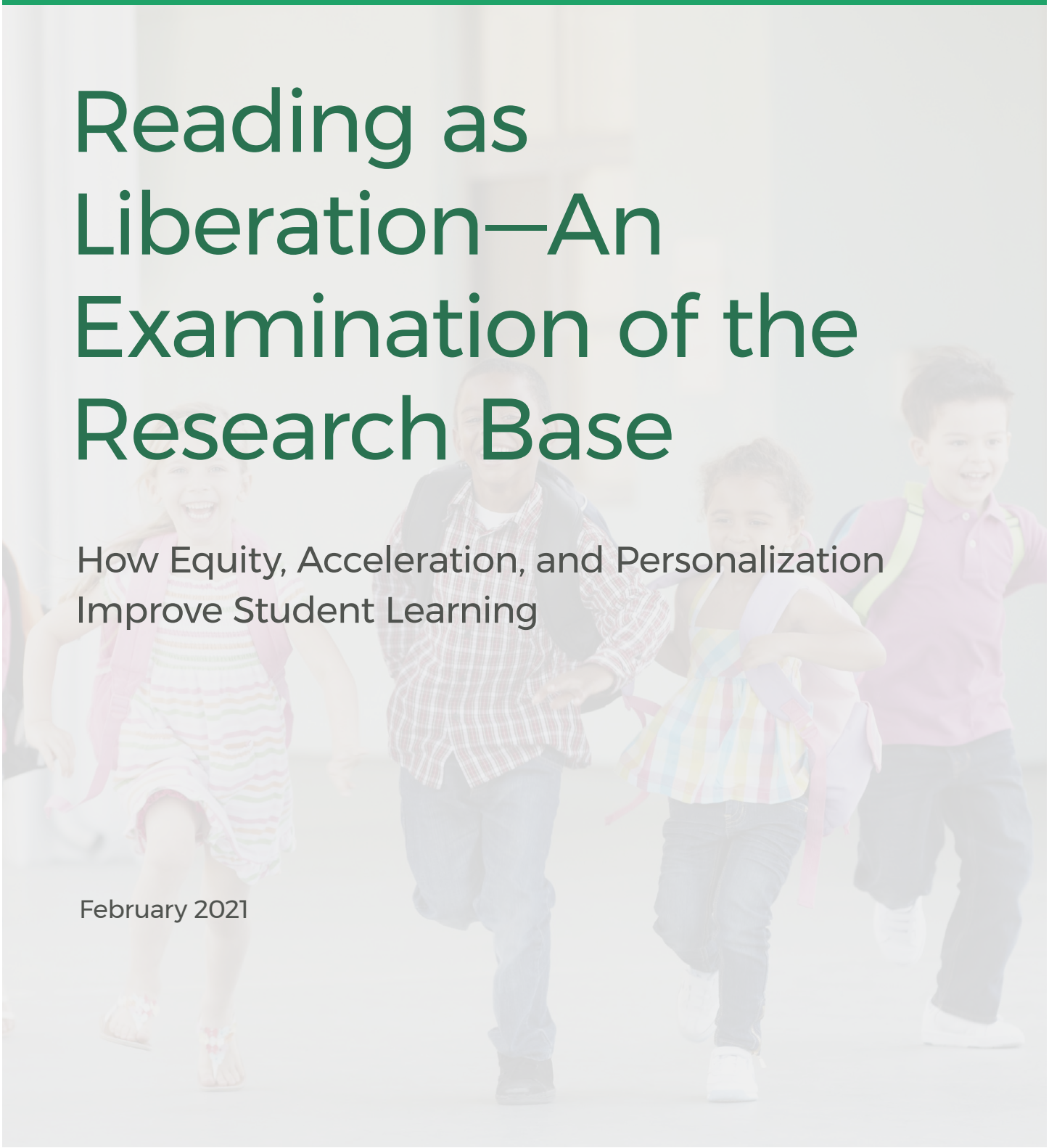
STUDENT ACHIEVEMENT PARTNERS

Reading as Liberation—An Examination of the Research Base

How Equity, Acceleration, and Personalization Improve Student Learning



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Sue Pimentel and **Meredith Liben**, *Student Achievement Partners*, served as lead writers of the report. They wrestled to ground a voluminous yet thorough and thoughtful synthesis of several intersecting research bases prepared by our team of scholars:

David Liben	*Student Achievement Partners*, tirelessly brought into clear focus the large research base of practices that accelerate literacy for students.
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INTRODUCTION & EXECUTIVE SUMMARY

Examining the Research Base for Literacy Accelerators & the Intersections for Equitable Personalization

INTRODUCTION

Reading is liberation. Being able to read well opens doors. Reading is rich and complicated; an intricate mix of various habits, skills, confidence, and knowledge. The other skills of speaking, listening, writing, and facility with language add to and strengthen the threads of the rich tapestry. Erratic and uneven access to literacy instruction exacerbated by the current pandemic is intersecting with a long-delayed racial and socio-economic reckoning in America. Conventional models of classroom-based instruction aren't meeting the needs of vast swaths of students, particularly those frequently at the margins of design considerations and resource allocations. At the same time, vital questions about how to ensure all school-aged children learn to read and write capably and with confidence have gained even greater urgency. So too, the disruption has created an environment ripe for new opportunities to reset how we do things to make literacy instruction more effective for all students.

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WHO IS THIS PAPER INTENDED FOR?

The audience is at once specific and broad. Those who serve education, either philanthropically or through developing products and materials for students, will find essential information to guide their literacy investments. The audience also includes all educators—those at the school and district level—who are seeking ways to accelerate student outcomes in literacy and considering how personalized learning approaches might enhance that acceleration. Fair warning! The paper is lengthy and detailed, packed with research syntheses and the implications the evidence points to. This is by design, with the hope of providing funders, product designers, and educators of all stripes as much solid guidance as possible.

Further on in this summary, under the heading "A Road Map to the Report," a "choose-your-adventure" way through this research compendium is laid out for you.

At the same time, vital questions about how to ensure all school-aged children learn to read and write capably and with confidence have gained even greater urgency. So too, the disruption has created an environment ripe for new opportunities to reset how we do things to make literacy instruction more effective for all students.

1. LITERACY ACCELERATOR DRIVERS TO BUILD STRONG READERS AND WRITERS

First, forming the basis of all else, is ensuring students have access to the full set of literacy accelerators those elements that have a formidable research base for their collective effectiveness. Time is a scarce commodity in educating students—now made more compressed by months of school closures. Anything that distracts in English language arts classes from the focus on students learning to read, reading and listening to content-rich texts widely and deeply, and responding to what they read through lively discussions and writing—will need to be stripped away. To that end, we describe and provide a brief research synthesis for each of the five essential components of literacy: the accelerators for every student learning to read and use language capably:

1. **Making sure students learn how to read:** securing solid foundational reading skills early on in students' school careers (ideally by grade three) so students can continually develop as fluent readers in every grade level thereafter.
2. **Growing knowledge of the world** so students develop a trove of knowledge to reference whenever they read.
3. **Expanding the vocabulary children bring with them** through a volume of reading and word study.
4. **Marshalling evidence and communicating it** when speaking and writing about what the text is conveying.
5. **Deepening understanding of what is read** through regular reading of ever richer, more complex text, with supports as needed **for universal access and success**.

Collectively, these syntheses rest on more than 500 studies that have been reviewed and distilled into what we hope are easy-to-digest summaries. While each of the accelerators is well established in the literature, they are not often fully enough integrated. Indeed, as you'll see throughout the syntheses, they work in concert; they bolster one another in innumerable ways. Each is essential, but they only genuinely accelerate student literacy when exercised together. The implications of this truth have too seldom been appreciated or enacted in the teaching-and-learning students' experience. Therefore, this paper makes a strong case for ensuring that a research-based, comprehensive set of instructional materials drives literacy learning in schools. The best of them integrate these literacy accelerators in powerful ways. Ensuring such power is in the hands of teachers and students is this paper's a priori recommendation.

2. PERSONALIZED LEARNING BOOSTERS TIED TO THE LITERACY ACCELERATORS

Second is personalized learning customized to each literacy accelerator. Personalized learning is not new to education. It has been around for millennia, and in recent years, it has roared back into fashion.

As we—researchers and literacy and equity experts—gathered together for our inaugural meeting, our first task was to precisely define personalized learning as it pertains to promoting literacy growth. Perhaps unsurprisingly, we were faced with a dizzying number of definitions and little agreement on any one of them. As this is a moment of high interest in personalization, the ideas of what it is and what it could be are varied, fluid, and sometimes contentious. We chose to get pragmatic and define personalized learning in ELA/literacy

from the perspective of K–12 practitioners and the goals they seek. We arrived at the following definition as the best current statement of what it should be in (regular) school settings at this moment for our focus:

> *Personalized learning in literacy education is an approach in which teaching and other learning experiences build on each student's strengths, address each student's needs, spur student motivation and agency, and help all students meet grade-level standards and, ultimately, achieve college and career readiness.*

As we define it, personalized learning is an instructional approach, not a product (though it could encompass products). We intentionally created a "big-tent" definition that includes practical teaching and learning methods and strategies designed to customize learning matched to each student's skills, abilities, identities, preferences, and experiences.

We hold there are indeed known and powerful avenues that would allow for such acceleration to take place—meaning approaches that would support students in meeting grade-level standards and college and career readiness in a timely manner. Abundant research in cognitive science exists about the processes for learning to read and what matters most in growing successful readers. Empirical research in what constitutes effective personalized practices in literacy is scant, however, and lags well behind reading research. In the words of leading personalization expert John Pane (2018):

> "Those who want to use rigorous research evidence to guide their [personalization] designs will find many gaps and will be left with important unanswered questions about which practices or combinations of practices are effective. It will likely take many years of research to fill these gaps. Despite the lack of evidence, there is considerable enthusiasm about personalized learning among practitioners and policymakers, and implementation is spreading." (p. 1).

Many people in education are excited about the possibilities of personalized learning as an approach to support acceleration of learning for many students. We share this enthusiasm, but our findings from the personalization research make it clear that personalization *must* be driven by and in service of the content being taught, in this case, each literacy accelerator. As pointed out earlier, the pandemic has pulled the curtain back on the fact that a one-size-fits-all approach to school is failing too many students—disproportionately those students from historically marginalized groups, such as Black students, students learning English[1], or students whose families are experiencing prolonged economic hardship. Research on literacy and cognitive science provide insights into what types of personalization approaches can make a difference in their lives.

3. EQUITY CONSIDERATIONS ARE AT THE CENTER

The third component is equity because it undergirds—is pivotal to—both the literacy accelerators and personalized approaches to student learning. We are purposefully including equity considerations as to not do so would be unconscionable. We are deliberately expanding our focus to urge the field to consider not only how much measurable student growth personalization (and the literacy accelerators themselves) might provide—though we feel that is a crucial feature—but also how these approaches land on students, teachers, and the classroom environment to create a wholesome place to come together for learning.

While the literacy accelerators examined in the body of this paper hold for all students, the particular lens applied here focuses on increasing students' literacy capacity who have not been well-served in public schools and whose learning needs have been pushed to the margins of resource allocation and focus. That focus also makes steady attention on equity concerns of paramount importance. As discussed above, we draw specific attention to the needs of students from historically marginalized and underserved groups, including

[1] This group of students is referred to in various ways, including English learners (ELs), English language learners (ELLs), and emergent bilinguals (EBs). We use English learners, or ELs, in this paper since it is the term used in the most recent federal legislation (ESSA) and in most general use.

Black students, students learning English, and students currently experiencing poverty. These identifiers have become all too predictive of students' academic outcomes. That needs to stop, and this moment provides us with an enormous opportunity to do much more and a whole lot better by students too long historically marginalized.

Three principal recommendations emerged as we undertook this study and worked with those steeped in equity research:

One: Care must be taken not to deem a certain segment of students deficient based on quantitative metrics—often a single test score. "The power of tests to translate difference into disadvantage" is borne most sharply by the students themselves (Cole, 2008, p. 6). They are condemned to months of low-level, dead-end work, having ostensibly been diagnosed by a test, with little regard to whether the test could even diagnose such a thing. Rather than attributing student failures to lack of ability, those results should spark a determination to uncover the deficits in the systems meant to serve students (Paunesku, 2019). If students aren't learning at grade level, we need to change the approach to teaching them.

Two: For students to thrive, they need to have a sense of belonging and safety—a rapport and bond with their teacher(s) and peers. They need teachers who believe they can learn at high levels and literacy work that honors their cultures and communities while opening the door to the wide world (Paunesku, 2019). Young people are astute at knowing whether their teachers respect their brains and believe they can succeed with grade-level work; they need that assurance to risk trying to put their best effort forward in class. Whole class, small group, and personalized literacy learning necessarily grow out of the larger social context of the classroom. Collectively, we must stop identifying students as the thing to fix, and mend the learning environment to empower students to prosper.

Three: Equity can't work as an afterthought or superficial gesture. It needs to be baked into instruction from the start, whether whole class, small group, or personalized. That means designing education tools and techniques to intentionally meet the needs of students from historically marginalized and underserved groups, including Black students, students learning English, and students currently experiencing poverty. That means supporting an equity-first method.

ENGLISH LEARNERS

English learners (Els) deserve special mention. The principal challenge for ELs in all-English programs—which is what most ELs in the United States are in—is that they are becoming literate in a language they are simultaneously learning to speak and understand. The challenge is not insurmountable, however, as proven by the fact that many students who enter school as ELs attain English proficiency and learn academics, are reclassified as fluent, make good grades, and graduate high school with their postsecondary ambitions intact (Saunders and Marcelletti, 2013; Kieffer and Thompson, 2018).

But neither is the challenge inconsequential. It is a double-barreled challenge for students and, just as important, their teachers. Teachers need to understand that ELs deserve the same grade-level literacy instruction that English-speaking students receive, as outlined in the following pages. But in addition, these students require targeted *supports* and ample high-quality English language development *instruction*. The two are not the same. The purpose of "just-enough, just-in-time" *supports* is to make sure that students comprehend content instruction that is provided in English. Such support might also help promote English language development indirectly. But English language *instruction*, the explicit purpose of which is to promote English language development directly, is vital (Goldenberg, et al., 2020). A student who hasn't developed English comprehension skills (regardless of language background) will require

greater emphasis on oral language development in English, particularly listening comprehension, as they progress through the grades. Otherwise, they will be unable to attain sufficient proficiency to read the language written in their books to permit grade-level-appropriate reading comprehension. Oral language proficiency plays a role at all stages of reading development (relatively less at first, with word knowledge the most important for learning how to read) increasingly as students progress through the grades, and the English-language demands of reading and writing increase (Goldenberg, et al., 2020).

Teachers need to tap the considerable resources that ELs bring to school, including knowledge of a home language(s) and culture(s). These assets should be leveraged for English acquisition, boosting reading achievement, learning more broadly, and graduating fully functional bilingual students (National Academies of Sciences, Engineering, and Medicine 2017). Research shows that ELs perform better on tests measuring comprehension, reading, spelling, and vocabulary when their home culture and language are valued and incorporated into academics (Doherty et al. 2003).

A truly productive approach to literacy learning must advocate for ways to fundamentally redesign the schooling system, not just maintain the trappings of school as we know it. We believe this crossroads represents opportunity, not threat. Dr. Gloria Ladson Billings has called this moment, deep as we currently are in a pandemic that has itself deeply disrupted how students are experiencing school, an opportunity to do a "hard reset" for how we educate in America, and we agree. When thoughtfully implemented and grounded in research-based practices for literacy and equity, our working hypothesis is that personalized learning approaches can serve as levers to help make up ground and accelerate literacy outcomes.

It is our intent with this report to provide fodder so this conversation can kick into high gear.

KEY LEARNINGS

We arrived at the components above after months of analyzing the research and consulting experts and educators. In the course of that process, several key learnings emerged.

- Five literacy accelerators lead to strong readers and writers. They are mutually interdependent and when activated, work together to produce results for students.

- A research-based comprehensive set of instructional materials should drive literacy learning in schools. The best of them integrate these literacy accelerators in powerful ways. Ensuring such power is in the hands of teachers and students is crucial.

- Personalization approaches have potential to accelerate literacy outcomes when they are employed equitably in ways that are in direct service to the literacy discipline. Personalization approaches must be tightly integrated into the specifics of the content students are learning.

- Of the five, some of the literacy accelerators are more conducive to personalized learning approaches than others. For example, Accelerator #1: Foundational Skills is ripe for personalization, while Accelerator #5: Deepening Understanding of What Is Read has fewer prospects.

- Much more research is needed to discover where the power of personalization is and for whom. Empirical research in what constitutes effective personalized practices in literacy is thin.

- Literacy learning inescapably grows out of the larger social context of the classroom. Quality of the instructional materials and approaches aside—including personalization—students need to feel safe, seen, and respected in their school environments to thrive.

- Equity can't work as an afterthought or superficial gesture; equity needs to be baked into instructional materials from the start, whether for whole class, small group, or personalized learning.

A ROADMAP TO THIS REPORT

This paper is divided into sections, designed to be as accessible and actionable as possible. The findings presented here, supported by research, are dense in places and can take work to wade through. Because the essential focus is on linking any discussion of personalization tightly to content (in this case, the content that has a robust research base for improving literacy outcomes), all personalization recommendations are embedded within the five sections of this paper that tightly synthesize the current research on each accelerator.

Remember you can start in one place and then work backward and forward to meet your goals, that is, set your route and pathway to meet your needs and desires. You might want to start with a focus on the executive summary and the personalization sections. Or you might skip to the appendices, where practitioner-facing resources and a proposed research agenda live. Wherever you decide to start, you may want to take the report in bite-sized chunks or study it with a group charged with improving student literacy outcomes.

Here's how the report is organized:

Immediately following this executive summary is the research base to guide the equitable implementation of personalized learning. Included there are essential elements to educating students who have too often been marginalized and neglected when designing learning approaches. The research is organized into four clusters, or buckets, to ensure any personalization approaches introduced into a school setting are:

- Advancing the right content that is integrated seamlessly into the subject matter students are working on,
- Promoting equity and counteracting bias,
- Cultivating student agency and elevating student interest in their learning, and
- Easy for teachers and schools to use and implement.

Next are a dozen operating principles drawn from the research that can help guide educators' recommendations. Keeping these operating principles in mind is essential. They will ensure student learning is guided by relevant research while personalization is authentically and equitably grounded in the individual needs of students against the specific demands of the subject matter. This is vital because the potential triumphs of personalized learning are matched by the known perils and problematic track record of some damaging approaches done *in the name* of personalization. Some practices labeled as differentiated or individualized instruction have done harm to students already chronically marginalized in school because of their race, language base, or family's economics. Students have been tracked into low-level classes in

which they are purportedly working at their individual instructional levels or isolated in "ability" groups within heterogeneous classes. They're left mired in low-level "individualized" work, often accompanied only by a humdrum worksheet or computerized practice program. They have been denied thought-provoking and inspiring work while simultaneously not having their learning needs met. The principles are meant to gird against such harmful approaches done in the name of personalization and ensure efforts are in service of the true promise of personalization.

The heart of this paper comes next; it contains five research syntheses—each one dedicated to a literacy accelerator, establishing the case for the role each area of literacy contributes to powerful reading outcomes and demonstrating how interconnected each accelerator is with the others. The conclusion of each synthesis contains the specific recommendations for promising personalized learning suitable to that sphere and determines which of those possible recommendations are most fruitful against the literacy research base and could provide an extra boost for students in that specific aspect of literacy, while remaining realistic to implement for teachers and school systems. Against the backdrop of the specific literacy accelerator, considerations for the application of personalization are presented in light of the research base for both equitable schooling and what is known of effective personalization practices. There is not yet a separate personalization research base robust enough to support these recommendations—which points at essential work for the research community to investigate. They are therefore embedded and in service to improving literacy—not decontextualized as snazzy nice-to-have tools or treated as an end in itself.

Following the syntheses and personalized learning recommendations are resources designed to be useful for school or district-based decision-makers. We have developed pinpointed sets of questions to activate the operating principles in specific uses and instances. These to-the-point consideration questions are for stakeholders to ask themselves what exactly they are trying to accomplish when reviewing their current personalized learning approaches or considering adopting new approaches or products. These questions will be handy for developers since they'll provide insight into what their customers may come to demand. Following it is an application chart (Appendix B: Implementation Guidance for Literacy Acceleration) that looks at various common situations in ELA classrooms. It is organized by literacy accelerator and then sorted into the three most common program approaches in classrooms: 1) basal reading programs, 2) classrooms following a balanced literacy approach, and 3) classrooms already using a research-aligned comprehensive program that includes each of the literacy accelerators. That chart has near-term classroom applications possible to do relatively easily and longer-term recommendations for broader changes to move teaching and learning closer to realizing the full power of the accelerators for students.

Finally, there is a call for further research (Appendix C) with our recommendations for fruitful areas of early focus. The fact is too little is known about what constitutes effective personalization practices. The notion of giving each student exactly what they need is a seductive and checkered area of educational resource allocation. Too many dollars have been tossed into the stream of hopes and promises without benefit of an empirical research base. We need to know better what works for the students we ask to experience these approaches.

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PERSONALIZED LEARNING

Applying Research on Promoting the Right Content, Equity, and Student Agency to Personalized Learning Approaches

Can personalized learning approaches and products accelerate literacy outcomes and boost students' reading ability? To that question, we answer a qualified "yes." Though there is anecdotal evidence coming from personalized learning products and approaches, little empirical efficacy research exists to help us answer this question with precision. We are, however, optimistic that personalized learning products and approaches could help boost students' reading ability and literacy outcomes because the research base of literacy and cognitive science laid out in the following sections of this report point to many promising avenues where personalization could indeed accelerate literacy gains.

As noted in the Executive Summary, a multitude of definitions of personalized learning exist (Pane, 2018; Herold, 2019). Personalization experts remind us that much is in flux, and there is no widespread public agreement on any one definition of personalized learning. They recommend landing on one that is broad and inclusive enough to include a range of instructional strategies and materials adopted by schools to support student learning. For the purposes of this paper, we followed this advice and landed on a pragmatic practitioner-perspective definition of personalized learning:

> *Personalized learning is an approach to education in which teaching and other learning experiences build on each student's strengths, address each student's needs, spur student motivation and agency, and help all students meet grade-level standards and, ultimately, achieve college and career readiness.*

While our definition is purposefully wide-ranging, labeling a product or approach as personalized does not make it so. LEAP Innovations, an organization that works with schools to design and implement personalized learning approaches, worked with schools to select products that would support personalized learning (LEAP Innovations, 2016). The group convened a panel of learning scientists, subject-matter experts, and educators to review personalized learning products and found that only 9 of 29 products—less than a third—met the most basic criteria established by the panel.[1]

There are personalized learning products and approaches that are a force for good—valuing humans, respecting identities, motivating students, and bringing them into grade-level work. There are also products and approaches that claim to be personalized that are a force for harm. Under this "in name only" banner, we include personalized products and approaches that silo students for extended periods on computers and products and approaches that track students into lower-level work. The most effective personalized

[1] LEAP Innovations criteria included "the potential for student impact; company strength and stability; alignment to learning science and Common Core standards; augmentation of teacher capacity; and functionality around student feedback and motivation."

education techniques known to date have a profoundly human touch, ubiquitous in all cultures and with an ancient lineage: face-to-face human personalization, differentiating according to individual needs and likings. Academic tutoring, where one tutor sits with one student and educates in a way deeply responsive to that student's current skill level and current learning needs, is a prime example.

Personalized learning with an established and proven track record of success exists primarily in mathematics. But that's math; we're focused on literacy. Personalizing reading and writing for students is thoroughly distinct from doing it in math. One area of literacy somewhat akin to mathematics in linearity is foundational reading. There, skills and instruction can progress in a sequence that leads to proficient and automatic word and sentence reading. Imagine a world where teachers could summon the precise foundational skills each student needs next. Imagine those learning opportunities get served in various forms tailored to each child's inclinations—either via learning games or full-body Wii-type activities that practice foundational skills through movement and chanting, all while the teacher coaches, reinforces, encourages, and praises students to ensure progress. Imagine further students choosing what aspect of recently learned course material they want to pursue to deepen and expand their learning. They select the resources (e.g., texts, visuals, multimedia) assembled for their extended learning and interact with easily accessible readings on their chosen topic. Imagine this program providing each student with immediate, targeted feedback based explicitly on their error patterns. This activity is currently primarily teacher-directed, but could be technology-enabled or driven by student choice. Such sophisticated capacity is within reach and may already exist but is so new to the market that it hasn't yet been rigorously studied to be practicable in real settings.

> The most effective personalized education techniques known to date have a profoundly human touch, ubiquitous in all cultures and with an ancient lineage: face-to-face human personalization, differentiating according to individual needs and likings.

What follows are lessons from research that show us how we can best use personalized learning approaches and tools to accelerate all students' literacy learning, amplify what matters most, and do so equitably and justly to the greater good of all students.

Research tells us that personalized learning must advance the right content in the right ways

The five key literacy accelerators lead the way. They lay out a research-aligned blueprint for how teachers can advance students' reading and writing capacities.[2] Tools and techniques that promote these activities should be given priority so students grow the vocabulary and knowledge they need and learn how to deal with complicated syntax and cohesive links in texts. When tied directly to one or more of the literacy accelerators, personalizing learning has the potential to boost outcomes and provide opportunities for students to explore particular topics driven by their individual interests.

The research on literacy and learning science is more settled than that on personalization and strongly points to the idea that content should drive instruction. Decades of work have gone into developing rigorous instructional materials that follow this research and should not be discarded to "personalize" instruction for individual students (Pane, 2018). By that same logic, personalized platforms (or non-tech-based personalization strategies) that provide skill- or knowledge-based practice can (and should) be integrated within a more extensive research-based content-rich curriculum. While there is compelling evidence to suggest that personalized virtual tutoring programs (where student work is responded to by an avatar or other AI device) can be effective at improving student learning generally (VanLehn, 2011), merely putting students in front of a supplemental computer-assisted instructional program a few times per week is not sufficient to improve student literacy skills (Slavin, et al., 2009).

There is a robust body of research on the benefits of social and collective learning that should be held in mind as schools work to personalize instruction (Slavin, 2015). Students learn more when they can talk and work together than when they work independently (Cohen et al., 1989). Personalized learning can be most impactful to fill in gaps in the core content of the course, including building background knowledge, appealing to different modalities of learning, practicing particular skills, and using opportunities to go deeper on a topic of interest or relevance, individually or with similarly interested peers.

This all suggests that the time students spend on personalized tasks—whether working by themselves or on a small project group—should be closely monitored and intimately tied to the broader content of the course. And how we need to personalize to foster one accelerator is often different than how we need to personalize for another. Although personalized products and approaches are promising, they hinge on the extent to which the programs used are easily aligned with the wider curriculum. Bottom line, a Brookings study (Whitehurst, 2009) found using high-quality instructional materials—that is ones that include all five of the literacy accelerators—to be more cost-effective from an effect-size perspective than other reform measures.

> Personalized learning can be most impactful to fill in gaps in the core content of the course, including building background knowledge, appealing to different modalities of learning, practicing particular skills, and using opportunities to go deeper on a topic of interest or relevance, individually or with similarly interested peers.

[1] The five literacy accelerators are securing foundational skills, expanding vocabulary, building knowledge, marshaling evidence when writing and speaking, and practicing with complex text.

Research Tells Us That Personalized Learning—Like All Other Learning—Must Promote Equity and Counteract Bias

Personalized learning has potential to promote equity and counteract bias, but if it is not done carefully and intentionally (as with any instruction), there is potential for inequitable approaches.

There are ways to promote equity and mitigate bias in instruction that apply powerfully to personalized products and approaches. When teachers:

- Make learning meaningful, personal, and culturally congruent, students prosper (Gay, 2000).
- Know and affirm students' identities—rather than require students to leave their racial and cultural backgrounds at the classroom door—when they respect students in all their wholeness, students respond positively (Milner & Howard, 2004).
- Have and exhibit high expectations and seek to develop strong relationships with their students, especially those whose backgrounds differ from their own, students respond accordingly (Douglas et al., 2008).
- Show respect for English language variations and know how to bring such variations into the instructional lifeblood of the classroom, as shown in the work of Devereaux & Palmer (2019), students feel valued and perform better.

Our reading of the available research on promoting equity and mitigating bias should lead all potential implementers (and developers) to approach personalized learning with clarity about who they are designing for and how the product or approach will impact students who have various identities. To personalize instruction means to tailor instruction to each student by assigning students to individualized or small-group work. That necessitates teachers make judgments about each student's strengths, needs, and interests when designing, or co-designing, the personalized learning experiences.

As suggested by personalization experts (and members of the research team for this report), Drs. Doug Ready and Shani Bretas, three main avenues exist through which bias might be likely to operate in a particular personalized approach:

1. the assessment of student skills;
2. the nature of the content that is assigned based on those measured skills; and
3. the pedagogical approaches used to deliver that content.

> Our reading of the available research on promoting equity and mitigating bias should lead all potential implementers (and developers) to approach personalized learning with clarity about who they are designing for and how the product or approach will impact students who have various identities.

Let's review how these operate in personalized learning products and approaches.

Personalized approaches typically assign students content through standardized assessments, including both short-cycle daily measures and longer-interval formal assessments. Regardless of the particular measurement approach, the consideration is to guard against assessment methods systematically under- or over-estimating

skills among certain student populations, exacerbating inequalities in the nature of the content provided. When these processes rely on standardized assessments, results will be biased to the extent the standardized assessment itself is biased. Stereotype threat in assessments always remains a concern for students of color (Koretz, 2008). Tech-enabled products that rely on other assessment approaches, such as voice recognition, are also vulnerable to inaccuracies related to language and dialect variations among diverse groups of students. If a tech-enabled product is going to be used, it must not conflate dialect variations with lack of skill.

Of course, in their efforts to personalize content, teachers also rely on their own interpretations of their students. Teacher perceptions of student's academic abilities are not immune from bias either. They typically result in frequent underestimation of boys' skills, as well as the skill and knowledge bases of students of color and students from lower socioeconomic backgrounds (Ready & Chu, 2015; Ready & Wright, 2011). School contexts matter as well. Perceptions teachers hold of their students' abilities are strongly related to students' backgrounds and are too often inaccurate (see Jussim & Harber, 2005 and Weinstein, 2002). Only about half of a teacher's perceived disparities are explained by actual between-group differences. Specifically, even holding students' social and academic backgrounds constant, teachers working in lower SES and lower-achieving classrooms more often underestimate their students' abilities (Ready & Wright, 2011). This is not to say that teacher bias is exclusive to personalized learning; it is not. Bias can and does occur in all forms of instruction. But with personalization, because students are being assigned certain content matched to their skills, and other students in the class are being similarly but differentially matched, teachers should have heightened awareness of the potential for skewed perceptions.

> Shifting membership in learning groups can and should be a key tenet of personalized learning.

For instance, teachers need to be aware that research shows that students who speak varieties of English beyond what is standardly accepted in school frequently experience teacher bias, which subjects them to deficit thinking about student intelligence (Delpit & Dowdy, 2002; Nieto, 2010). Language bias pressures students to make decisions about their identity and asks them to choose who they will be with the effect of identity shelving and alienation (Campbell, 1994; Devereaux, 2015; Reed Marshall, 2017). Bias against students' use of home language (e.g., African-American Vernacular English, world language) as a bridge to learning entrenches the belief that equates English use and intelligence. This is particularly true for students employing African-American or Black Vernacular English (Campbell, 1994). Again, this bias is not exclusive to personalized learning, but neither does it exclude personalized learning from its grip. In fact, in addition to teacher perceptions about students' language use, personalized learning programs may have built-in language biases.

In terms of the nature of the content provided, there are clearly equal concerns across both tech-enabled products and human approaches, given that both rely on adults to populate the collection of personalizable content available to students. Similarly, both tech-enabled and teacher-led approaches to personalized learning can—but certainly don't have to—isolate students on the margins of the classroom. From decades of research, we know teacher-created ability groups tend to segregate and stratify students (Brown Center on Education Policy, 2013; Lucas, 1999) unless group membership is permeable and students are regularly assessed and given the ability to move among groups. Shifting membership in learning groups can and should be a key tenet of personalized learning.

Those implementing personalization should guard against producing a form of within-class academic tracking where some students are working at grade-level and others are stuck in remedial loops. Doing so limits the quality of student educational opportunities, decreases students' perceptions of their own academic abilities, and negatively impacts student achievement (Lucas & Berends, 2002; Oakes, 1985; Werblow et al., 2013). Students are stigmatized and lose self-worth while teacher expectations for their capabilities plummet further. Dropout rates can increase among students who are perpetually tracked. When school systems begin tracking and grouping students by ability in early grades, they tend to maintain these structures year after year, making

it difficult for students to move among academic levels. Students placed in lower tracks are given fewer opportunities to move "up" into higher academic levels. This is especially problematic for students of color and those whose families are economically insecure (Reichelt et al., 2019). These students are victims of belief systems about students from such backgrounds (Lucas & Berends, 2002). Such practices entrench and widen achievement disparities. In their work in gaining insight into tracking, Lucas and Gamoran (2002) found that the practice increases academic as well as racial and economic isolation, particularly for students tracked into classes identified as below grade level. Placement in course pathways identified as below grade level or less rigorous have the effect of widening academic achievement outcomes. Stratified class placement of students within courses identified as less rigorous has been shown to magnify inequality. Students in more rigorous courses are more likely to have more experienced teachers, more rigorous curriculum, and more research-based pedagogical process versus those in less rigorous classes (Applebee et al., 2003).

Moreover, while most educators, policymakers, and observers agree instruction should be at least somewhat differentiated to meet students, there is little evidence teachers alone are capable of implementing differentiation successfully at scale (National Mathematics Advisory Panel, 2008; Tomlinson et al., 2003; Petrilli, 2012). Acknowledging the challenge teachers face delivering differentiated (much less personalized) instruction, most modern models of personalized learning incorporate technology to aid in decision-making, provide ongoing feedback to students, and provide content targeted to students' skill (Pane et al., 2017; Escueta et al., 2017).

Differentiating instruction through personalization, however, does present opportunities for teachers to work with students to co-construct learning opportunities that best meet students' identified needs. When students are invited to work with teachers to determine their academic needs and structure the necessary learning to ensure they are moving toward and beyond proficiency, bias is mitigated. Equally important, student agency is boosted through such empowerment. Bias can also be counteracted when personalization focuses on all students—not only on students who need support acquiring grade-level skills but also on students who are ready to move beyond grade level to advanced levels of proficiency.

Personalized products and approaches must design for equity from the start and continuously improve as those products and approaches are used in racially, socioeconomically, and linguistically diverse classrooms (EF+Math Program, n.d.). We are well past the time for equity to be an add-on after development or for superficial gestures like adding models or avatars that are racially diverse and thinking that will satisfy.

Research Tells Us That Central to Personalization Should Be Student Agency and Student Interest in Their Own Learning

For students to learn at high levels, they need to 1) have a sense of belonging and safety through relationships with teachers and other students, 2) know their teachers and other key adults believe they can succeed, 3) have frequent opportunities to engage in relevant and culturally responsive work, and 4) develop a strong sense of agency over their learning.

Too often with personalization, the decision-making around who gets what and which products or approaches to adopt stem from the adults, in effect making students into the done-to—the receivers of the personalized approach. Students need to see value and understand the relevance to their lives in what they are learning, and that is even more important with personalization, where presumably the customization is being tailored to each student.

Why shouldn't students be engaged in these decisions, or at the very least have a clear understanding of the point of what's being applied? These student-facing factors are foundational to enabling academic success and thriving in life.

Maslow's hierarchy of needs demonstrates the importance of building a sense of belonging as a critical aspect of student learning (Maslow, 1943, 1954). Research pioneered by Northwestern University professor Kirabo Jackson demonstrates that improving students' motivation, work habits, and social skills produces even better results than schools that work only to improve test scores. Students rise to the occasion when they feel valued and supported. Jackson et al.'s (2020) research follows findings from several others that students' sense of belonging holds implications for academic outcomes (Slaten & Baskin, 2014) and is an important variable to academic adjustment, higher level of academic motivation, less absenteeism, better school completion, less truancy, and less "misconduct" (Pittman & Richmond, 2007; Gillen-O'Neel & Fuligni, 2013; Demanet & Van Houtte, 2012).

> Students need to see value and understand the relevance to their lives in what they are learning, and that is even more important with personalization, where presumably the customization is being tailored to each student.

Bringing students into the rationale—into the decision-making when possible—and engaging students deeply in their own learning takes extra time; it requires paying close attention to providing content that students find worthwhile and directly engaging students in decision-making about what topics, products, and approaches they find are worth attending to.

Providing K–12 students with some choice in their learning is positively associated with their engagement and academic performance (see Royer et al., 2017 for a literature review). Extant research, however, suggests that learners' self-reported learning *preferences* are only weakly correlated with their actual learning outcomes. Too much student choice can be overwhelming and move students too far away from their zone of proximal development (Kirschner & Merrienboer, 2013; Pane, 2018). To balance the positive and negative aspects of choice, Corbalan et al. (2006) suggest a process of shared control over tasks wherein teachers select a subset of tasks tailored to learners' needs, and students exercise choice within that subset. This, of course, should be adjusted for student maturity level.

The power of students' having agency over their own learning has been shown to interact positively with academic engagement and resultant learning outcomes. Having a degree of control and a solid understanding of why and how students are conducting their learning has results across grade levels. Work by the Chicago Consortium (Farrington, et al., 2012) and Azevedo, Guthrie, and Seibert (2004) attests to improved outcomes in general academic settings when students have agency. Wigfield et al. (2004) demonstrated this power in improving motivation and outcomes in reading comprehension when third-graders got a measure of control over what and how they were studying. Personalized learning can deliver here because, when done right, it fosters academic agency in students. Academic agency is evidenced by students developing skills to manage their learning, including setting academic goals (beyond achieving test scores), having opportunities to practice skills within the space of lesson design and execution, and gaining feedback on how their decision-making led to the goals set (Sen, 1985). Clearly this is a case where what is equitable and good for students is also very good for their learning outcomes.

Research Tells Us That Personalized Learning Must Be Easy to Use and Easy to Implement to Be Embraced by Teachers

Especially now, but always true, teachers are asked to flex to a variety of demands and situations. When considering personalized learning products and approaches, what the challenge in implementation will be needs to be considered and accommodated. If a given personalized approach, program, or strategy is capable of effecting meaningful change, it needs also to be doable in the classroom. That increases the likelihood that the reform will be sustained over time. Many personalized products and approaches, including tech-enabled tutoring programs, are easy to implement as add-ons and ask little of teachers in return. Add-ons can be just the extra boost students need to progress, and once teachers learn how to use them, they can make life easier for teachers. The central question—easy to implement or not—is whether or not there are academic benefits for the students who experience them? Equally important is whether or not the product or approach is perceived by teachers as coherent with what is already being learned in the class. Since the focus here is on applying personalization products and approaches to benefit and accelerate literacy accelerators, such coherence is already a nonnegotiable consideration.

One set of factors for ease of implementation can be organized under teacher "will and capacity"—do teachers want to implement a particular reform, and if so, are they capable of doing so (McLaughlin, 1987)? In terms of teacher will, buy-in among those implementing any policy is often key to successful adoption, particularly when the implementers (such as teachers) have discretion about the extent to which they will faithfully implement the reform (Lipsky, 1980). This is particularly true when the implementation is going to demand a lot from the teacher.

A second set of considerations is related to the scale of the personalized product or approach. Efforts to deeply integrate personalized products or approaches often present a more challenging undertaking. Given this, any effort to implement a large-scale personalized product or approach must be accompanied by meaningful professional development. And we know from the literature on successful professional development that teacher support for any new intervention must be: 1) participatory; 2) focused on specific subject-matter content; and 3) sustained over time (Darling-Hammond et al., 2017; Lynch et al., 2019; Kraft et al., 2018). Serious efforts to adopt meaningful personalized products or approaches that do not scaffold learning for the adults responsible for implementation are unlikely to find success.

There are some promising approaches in this regard. Station-based blended models—where students rotate through a series of tasks either as a group on a specified schedule or individually with more flexibility over timing—seem to be particularly appealing and potentially useful (Staker & Horn, 2012). Many teachers are

already familiar with the idea of a station rotation, which can ease some of the implementation challenges and make teachers more open to incorporating a personalized component into their already existing understandings. Bumping up the quality of what students engage in during stations is a positive.

As noted above, personalization can also involve the adoption of simple supplemental personalized products or technologies that are aligned with the broader literacy curriculum and serve to support the five literacy accelerators. These are likely easy to implement, often ask little of teachers in terms of changes to instruction, and can bring instructional value. More actionable specifics are explored in the recommendations at the end of each literacy accelerator synthesis as well as the Implementation Guidance for Literacy Acceleration (Appendix B).

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OPERATING PRINCIPLES

Equitable Operating Principles for Personalized Learning Approaches to Accelerate Literacy

Careful design and attention to the research behind literacy growth must rule any decision-making. Following is a set of principles that are relevant for any personalized approach—many applicable to any instructional approach—whether it is one teacher working with a small group of students, students engaging in self-directed learning alone or with peers, or a technology-enabled platform that uses sophisticated algorithms to create instructional plans for every student in a school. Central to our discussion below is that "personalization" in and of itself is not necessarily a good or bad thing for students. Instructional products and approaches that deliver low-quality content or that isolate and segregate students academically or physically must be avoided and do not deserve the mantle of personalization.

The core question to be asked of any product or approach—and it is a gateway to all others—is to pinpoint how it will advance grade-level work with the literacy accelerator(s). If the answer is it doesn't or is only vaguely or peripherally related to the literacy accelerator(s), then move on. Don't waste valuable student time or precious instructional dollars.

> The core question to be asked of any product or approach—and it is a gateway to all others—is to pinpoint how it will advance grade-level work with the literacy accelerator(s).

Once you have identified that a personalized product or approach is tangibly and positively tied to each of the literacy accelerators it targets, following is a set of operating principles—prompted by the research—that must be present to develop or use personalized learning well. The principles fall into four buckets, including:

1. **Advancing the right content,**
2. **Promoting equity and counteracting bias,**
3. **Cultivating student agency and elevating student interest in their learning, and**
4. **Ensuring ease of use and implementation by teachers and schools.**

TO ADVANCE THE RIGHT CONTENT, there are five operating principles to meet. The personalized product or approach you select should be:

- Part of coherent instructional sequences with a priority on working in tandem with high-quality instructional materials that are coherent by design and focused on the five literacy accelerators.
- Grounded in what we know about how the brain learns to read and what contributes to the long-term flourishing of reading comprehension.
- Based on what the class is doing and studying in every instance. Personalized learning follows rather than leads on content.
- A slice of a student's education. Classrooms are centers of cultural exchange and co-learning. Reading comprehension instruction is predominantly a social rather than an individual pursuit.
- Activated in response to real-time information about what students know and can do—including qualitative and formative measures—to advance grade-level learning.

TO PROMOTE EQUITY AND COUNTERACT BIAS, there are three operating principles to meet. The personalized product or approach you select should be:

- Designed to promote racial, class, and language equity in both the assignment and the delivery of literacy instruction, thereby counteracting biases actively. Students who have frequently been marginalized and chronically underserved such as Black students, students experiencing economic insecurity, and English learners cannot be siloed into below-grade-level lessons that mimic tracking. Decision-making regarding the assigned content is deliberative and transparent, checked, and re-checked in light of which students are getting what content.
- Designed to honor and accommodate variations in students' language and cultural heritage in ways that affirm rather than shelve identities.
- Built to elevate student assets and challenge destructive narratives about the academic ability of traditionally marginalized students.

TO CULTIVATE STUDENT AGENCY AND ELEVATE STUDENT INTEREST IN THEIR LEARNING, there are three operating principles to meet. The personalized product or approach you select should be:

- Built on trust relationships and respect between teacher and student. Personalized learning products and approaches must be embedded in a coherent, humane, social, and content-rich environment.
- Driven by students' interest and choice to capitalize on student's motivation and agency, whenever possible, *within* an identified area of academic focus.
- Proven to hold the interest, curiosity, and attention of students. It is rated by students as useful to their studies and beneficial to their future.

TO ENSURE EASE OF USE AND EASE OF IMPLEMENTATION FOR TEACHERS AND SCHOOLS, there is one operating principle to meet. The personalized product or approach you select should be:

- Easy to use and implement, so they are embraced rather than abandoned by teachers.

As an outgrowth of the findings set forth in this paper, and directly tied to these considerations, we have developed a set of concrete questions, organized as a series of action steps. These questions are intended to guide educators and designers in equitable, research based and specific decision-making. They are **Consideration Questions** (Appendix A).

Foundational Reading Skills Are, Well, The Foundation

VIEW RECOMMENDATIONS

OVERVIEW

Foundational skills are the cluster of tightly interrelated but discrete subskills[1] that together enable readers to process the alphabetic code into meaningful text. It differs from the other literacy accelerators in being a cluster of separable skills, each with several dozen patterns to master. In that way, it is analogous to arithmetic—to the math 'facts.' Each aspect of foundational skills names a slice of the skills and knowledge (print concepts, phonological awareness, phonics, word recognition, and fluency) that together constitute what the brain needs to learn and do to read proficiently.

The most frequent performance breakdowns for students struggling with reading generally stem from inadequate practice with foundational reading or scarce opportunities to gain fluency with grade-level texts, both relatively straightforward to reinforce.

Because foundational skills mastery is so crucial and the number of discrete skills to grasp is substantial, the pathway to success lies primarily through a well-structured curricular and instructional program that teaches these skills systematically and in a coherent sequence. As part of this program, there must be early screening and progress monitoring. Specifically:

- Appropriate early screening on key skills (beginning with letter names and sounds, followed by phonological awareness; phonics and decoding thereafter) to identify children at risk for reading difficulties, and
- Regular, diagnostic assessment to determine which skills are solidly in place and which need additional instruction or reinforcement.

The importance of differentiating instruction and practice opportunities based on appropriate early screening, frequent progress monitoring, with diagnosis as needed, cannot be overstated. They are key to each student's success. They are also key to providing students with opportunities to use what they demonstrate they already know as springboards to deepening their skills and to accelerating their growth as readers.

Findings in multiple studies reinforce the centrality of solid foundational reading skills to students' reading comprehension and broader literacy abilities. The seminal National Reading Panel's (NRP's) review two decades ago is chief among the works testifying to the strength of the evidence for solid early reading practices. The NRP unambiguously concluded that there are several key pillars of early reading instruction: letter names and

[1] This cluster of skills consists of letter names and sounds, phonological awareness, phonics/decoding (mastering these first three promotes rapid, automatic word recognition), and reading fluency.

sounds, phonological awareness, phonics/decoding and fluency. Students in the early grades should receive sufficient explicit, systematic instruction in these areas, along with the other accelerators, so that they become proficient readers by grade 3.

Too many teachers are *still* sent into classrooms without having been taught about this vital aspect of reading and how distinct it is from the other aspects of literacy that form the accelerators and, together, make up the science of reading. Given its neglect, it's no wonder that systematic and explicit instruction has fallen out of practice in so many schools. Recently, many around the nation—parent groups and reporter Emily Hanford being among the most outspoken—have sounded the alarm about the anemic teaching of foundational skills in our schools. Several recent influential studies in phonemic awareness, phonics, word recognition, and fluency described below show once again why foundational skills need to be systematically taught, frequently assessed, and robustly practiced, skill after skill, in a research-grounded sequence.

To become successful readers (and writers) of English, all students, regardless of ethnicity, language origin, or sociodemographic characteristics, must learn the same foundational knowledge and skills as mainstream English speakers do. These students also require that teachers and schools take into account their particular strengths, needs, and life experiences that influence their educational experiences and, ultimately, their success.

> Several recent influential studies in phonemic awareness, phonics, word recognition, and fluency described below show once again why foundational skills need to be systematically taught, frequently assessed, and robustly practiced, skill after skill, in a research-grounded sequence.

THE ENDURING BODY OF EVIDENCE

A 2014 paper by Linnea Ehri cemented the importance of orthographic mapping to students developing accuracy and automaticity in word recognition. Just what is automatic word recognition? Automatic word recognition means students recognize words rapidly without having to sound them out (decode them). It develops for any given word after enough successful encounters, provided the word is decoded correctly. The number of encounters varies from student to student. It is somewhat counterintuitive, but successful decoding ultimately leads to rapid, effortless word recognition without decoding. Successful decoding occurs when students commit decoded words and their sub-parts to long-term memory. When a student successfully decodes *weigh*, she has also learned that "eigh" makes the long /a/ sound and can then more easily decode *sleigh*, *weight*, and *freight*. The transferability available through such learning is a key to reading success.

Cognitive scientists call *any* word that is recognized automatically as a "sight word."[2] The number of words students can recognize automatically is called their "sight word vocabulary." Students with larger sight word vocabularies are better equipped to decode newly encountered words, both regular and irregular. They also are more likely to transfer the meaning of newly decoded words to long-term memory and far more likely to read fluently. That's because they have the cognitive capacity freed up due to that bank of cemented word patterns. This series of interactions is what is known as orthographic mapping. Again, how many times it takes for a word to become a sight word depends on the student. Natural variances exist: Some students need to see and decode words more times, some fewer, and some *far* more. There are obvious implications here for instruction based on diagnostic assessment, built-in practice, and personalization opportunities.

[2] For decades, educators have been defining "sight words" differently than cognitive scientists have been. Educators have used it to mean irregularly spelled words that students memorize. Cognitive scientists define sight words as terms automatically retrieved—within a quarter of a second!—once students have decoded them successfully some number of times (again, how many depends on the student). In other words, students recognize words on sight, effortlessly, and automatically without decoding. NO memorization is involved.

David Kilpatrick's (2016) work grew out of Ehri's to examine why many students fail to gain the advantages of orthographic mapping and don't recognize enough words effortlessly and automatically *despite accurate decoding*. Kilpatrick drew on previous research (Rosner, 1971) to develop an expanded notion of phonemic awareness:

1. *Basic phonemic awareness*, common in the literature and instructional materials, is mostly limited to blending and segmenting phonemes within words. It is now part of every systematic phonics program.

2. *Advanced phonemic awareness* (sometimes called phoneme manipulation) expands on basic phonemic awareness to include the ability to delete and substitute phonemes. Essentially, advanced phonemic awareness is a nimbler manipulation of sounds. For example, substituting medial vowels (*hid* to *had*), ending sounds (*roof* to *room*), and deleting or substituting internal phonemes in the beginning and ending blends (*flute* to *fruit* or *paste* to *paint*). Remember, phonemic awareness involves only the sounds, not the letters that represent the sounds. This idea of deep manipulation of sounds inside words having value is new, even for knowledgeable early elementary teachers.

A few years later, Paige et al. (2019) conducted the first study to employ PATH analysis to test a hypothesized model identifying connections among letter-sound relationships, pseudo-word reading, sight-word reading, and fluent reading to scores on an end-of-year state reading test. It demonstrated the direct connection between proficiency in foundational skills (automatic and accurate word recognition and fluent reading) and achievement on state reading comprehension exams.

Paige provided teachers in his study with a two-year-long course on systematic phonics. He did so in a large city in a southeastern state, working with teachers of low-income students who also were mostly of color. The same year, John Sabatini et al. (2019) extended those findings at a national level with a vast study, showing that fluent reading was the strongest predictor of comprehension on the NAEP. His research helped confirm the scope of the sight word recognition deficit in our student population, along with the devastating and persistent effects of failure to support student attainment in this area. Students who read too slowly were not fluent, which impaired comprehension. Bottom performers read at an average rate of 68 words per minute (WPM) compared to the national average for fourth grade (Hasbrouck & Tindal, 2017) of 112 words per minute. Ninety percent of the students who read at a slower rate scored *below proficient*—a full 73 percent of them scored *below basic*. Nearly a quarter of all students nationally lack the word reading proficiency to comprehend fourth-grade level texts. Paige and Sabatini's work show the importance of students having proficient foundational skills and, in particular, automatic and accurate word recognition and fluent reading. Again, Black students, English learners (ELs), students from other historically marginalized groups and students from households experiencing economic hardship have for too long been the students afflicted with these low performance scores. Our teaching approaches must be adjusted to turn these outcomes around. The stakes are too high.

HOW DO FOUNDATIONAL READING SKILLS—INCLUDING FLUENCY PRACTICE—DRIVE COMPREHENSION?

Fluent reading is dependent on efficient, integrated, foundational reading processes, including phonemic awareness and knowledge of letter-sound correspondences. Through instruction and practice, students gain automatic word recognition. When these processes are in place, students have a much greater likelihood of possessing the decoding skills necessary to bootstrap their reading of words to facilitate fluent reading (Share, 1995). While word automaticity is essential to fluent reading, students must also learn to read words in connected text and become familiar with the syntax that becomes increasingly sophisticated across the grades as text complexity increases. All of these capacities must be developed, so students' attention moves

beyond the words on the page to consider the ideas and information being transmitted—to becoming capable and independent comprehenders of what they read.

Once fully mastered, this suite of reading skills forms the foundation from which readers can comprehend the words and sentences they read, and students can thereafter make sense of reading for themselves. Paige et al.'s work (2019) showed that students proficient in foundational skills were almost seven times more likely to be proficient on the state reading comprehension assessment than students who were less adept at foundational skills. That intervention provided foundational reading knowledge to the teachers of students who were then evaluated on their foundational skills by the researchers. Those students with a solid base in foundational skills performed better on the third grade test than students who lacked foundational skills. Similar to the work by Sabatini et al. (2019), the researchers noted, "Our results advance the idea that achievement in foundational skills leads to increased orthographic knowledge and reading fluency that is then likely to result in proficiency on the state-administered reading assessment" (Paige, et al., 2019). This would seem to demonstrate that providing students with solid foundational skills can disrupt the beginning of the Matthew Effect's vicious cycle, where the difference between proficiency in readers increases over time (Stanovich, 1986).

Whether done aloud or silently, fluent reading is another crucial component of students' reading comprehension. LaBerge and Samuels conducted a study decades ago (1974) to unbundle the interaction between word automaticity and fluency. One group of students practiced automaticity at the word level while the other group engaged in fluency practice with connected text. Students in the connected text group showed significant improvement beyond those who worked solely on word automaticity. Since we saw above that automatic word recognition is also crucial, these findings may point toward a "two for one" effect of practicing fluency with connected text, impacting rapid word recognition as well as fluent reading. Two seminal studies, one by Chomsky in 1978 and a second by Samuels and LaBerge in 1983, examined the efficacy of repeated readings to improve fluency. After accurate modeling of the target passage, students read a short text of 100 to 200 words four or more times over several days. Students read in the company of a teacher or a more knowledgeable reader to assist them with difficult word pronunciations. The two studies established that practice using repeated readings decreased word mispronunciations and improved reading rate, resulting in improved reading fluency. Comprehension improved as students focused less on word decoding and more on creating meaning from the text.

> Bottom line, research shows that fluent reading accounts for about one-quarter to one-half or more of the differences in students' reading comprehension levels. When a reader is fluent, they can focus their mental attention on understanding rather than pronouncing the words on the page.

These findings mirrored the benefits of fluency to free cognitive capacity Ehri (2014) would find decades later. These studies also show that reading fluency improves through repeated and coached reading practice when sufficient underlying reading skills are in place.

Following that research, Lee and Yoon (2017) conducted a meta-analysis of 34 studies where teachers employed repeated reading as an instructional strategy for students with reading disabilities. The authors found this strategy resulted in significant fluency improvement with a moderate effect size.

Bottom line, research shows that fluent reading accounts for about one-quarter to one-half or more of the differences in students' reading comprehension levels. When a reader is fluent, they can focus their mental attention on understanding rather than pronouncing the words on the page. Reading theorists have suggested

that fluency occurs when the numerous reading processes are synchronized. For decades, empirical studies had shown a moderate correlation between reading fluency and comprehension; however, several recent studies go much further (Dohower, 1987; Fuchs, et al., 2001; Kim et al., 2011; Swanson & O'Connor, 2009). They suggest a causal connection. These studies also showed that prosody (expression) predicted reading comprehension either in place of or in addition to rate.

HOW CAN WE SOLIDIFY STUDENTS' FOUNDATIONAL READING SKILLS? HOW CAN PERSONALIZATION BE USED TO ASSIST?

The implications of all of these studies for teaching and learning are clear: For the vast majority of students, foundational reading skills need to be systematically taught, carefully assessed, and robustly practiced (in response to assessment results) skill after skill in a research-grounded sequence through a research-based program. There are several excellent foundational reading skills options on the market.[3] They contain all of the elements outlined above, though not all have yet incorporated advanced phonemic awareness, along with regular assessments of student progress. Homegrown or piecemeal attempts to create comprehensive foundational skills are inadvisable and potentially disastrous for vulnerable populations of students—especially for students who arrive at the schoolhouse door more isolated than their peers from texts. Likewise, assessments, whether computer-based or teacher administered, should in all cases be integrated seamlessly into the foundational skills program. By far the simplest way to achieve this is through a solid program that contains all these ingredients in one package.

> Homegrown or piecemeal attempts to create comprehensive foundational skills are inadvisable and potentially disastrous for vulnerable populations of students—especially for students who arrive at the schoolhouse door more isolated than their peers from texts.

Weekly assessments of what is being taught and previous skills (in grades K–3) are critical to providing clear concrete information to address what to do with students who perform poorly with one skill or another and need more practice. In grades 2–3, periodic and universal measurement of fluency with grade-level text is necessary to monitor and provide additional support for students who need them. Fluency checks should be administered at the beginning of the year with grade-level text and readministered as needed throughout the year. Fluency checks should also be administered to older students exhibiting reading problems. Dysfluency is as likely a source of reading problems regardless of grade level. Because text increase in complexity across grades and genre, being fluent in one grade does not guarantee fluency in succeeding grades. If dysfluency is revealed, then students should get the practice and support they need to become fluent. Such checks should attend to students' appropriate accuracy rate using nationally verified norms. Teachers can administer additional regular fluency checks in lots of low-stress ways (e.g., listening in on choral or buddy reading). Here's an essential note to keep in mind as we teach students to read: Fluency ability does not have anything to do with intelligence. In fact, the ability to read fluently resides in a completely different part of the brain; it is like a muscle that can grow stronger when exercised.

Assessments—a central part of any systematic, explicit foundational skills program—allow teachers to identify students who need specific, targeted, and personalized supports. So foundational skills, once introduced and practiced whole class, can be differentiated and personalized based on the results of those frequent assessments. Students will display strengths in different strands of foundational skills. Some students will attain

[3] Open (free) resources include Bookworms, CKLA Skills Strand, EL Education Foundational Skills, TN Best for All.

mastery with very little practice and should have opportunities to work on other aspects of reading. Many other students will need more practice opportunities in different forms to pick up a given skill at first. A few students will need lots of opportunities to practice skills before they reach mastery. Each and every student should get the exposures needed to gain mastery and confidence in early, foundational reading.

> To implement foundational skills programs equitably, we also must ensure that in addition to holding high expectations for all students that all students have access to a full range of supports, culturally relevant content and practices, and aligned instructional materials. That is not the case now.

Reading science has shown us *what* needs to be amplified in early reading, but for this practice to be equitable for students, we must also address the *how*. For example, it is important and valuable for teachers to make connections between book English and students' home language(s) or dialects. Doing so allows teachers to leverage—and honor—each child's existing knowledge and skills and seize the opportunity to explicitly teach the connections and differences between the home language(s) and English. To implement foundational skills programs equitably, we also must ensure that in addition to holding high expectations for all students that all students have access to a full range of supports, culturally relevant content and practices, and aligned instructional materials. That is not the case now.

Recommendations

Below are ways for teachers—based on that frequent assessment data—to personalize students' learning through a prism that values students' backgrounds, languages, cultures, points of view, knowledge, and skills:[4]

1. FOCUS ON SUPPLYING THE FOUNDATIONAL SKILLS (PHONEMIC AWARENESS AND PHONICS) NECESSARY FOR READERS TO GROW THEIR SIGHT WORD VOCABULARY:

Share (1995) had noted that a strong base in phonics allowed students to engage in self-teaching of new words and thereby improve their reading comprehension. He showed that self-teaching is the *primary* vehicle through which students can grow their sight word vocabularies. Self-teaching here refers to the idea that students who know enough phonics to decode successfully will teach themselves to recognize new words as they read and increase their sight word vocabulary. They also reinforce the phonics patterns they know through this practice. For example: If a student knows all of her consonants sounds, consonant blends, and short /i/, the word *list* will become a sight word after some number of repetitions. Similarly, if she knows the long *A* rule, all her consonant sounds, and the short /i/, the word *mistake* will become a sight word after some number of repetitions despite being a longer word and two syllables. Share noted several significant findings that allowed students to self-teach.

OPPORTUNITIES FOR PERSONALIZATION?

Yes! Personalization is crucial in foundational skills instruction. Many opportunities exist that can

[4] The products and approaches named here are called out because they are known to the authors and align to the research supporting this accelerator. They are examples that could work, not an exhaustive list. Careful evaluation against the Consideration Question and vetting should be undertaken before making any decisions about the utility of any of these for your needs.

tailored to assist students with what they need. Ehri (2014) explicitly called out several preconditions (outlined below) necessary for readers to retain words in memory and increase their sight word vocabulary. They can be taught and practiced as much as each student (of any age) needs through a variety of human- and tech-enabled personalized options. What is crucial is that each individual student gets the opportunities to practice to reach the mastery she needs. Here are some specific areas:

- **Build phonemic awareness:** Phonemes are the smallest sounds in words. Phonemic awareness is the ability to focus on and manipulate phonemes in speech. Students who have phonemic awareness have two types of understandings about decoding words: segmenting and blending.

- **Focus on advanced phonemic awareness:** Kilpatrick's work (2016) shows that our weakest readers, at any grade level will need work with advanced phonemic awareness—in addition to phonics instruction and reading as great a volume of texts as possible. Proficiency in advanced phonemic awareness requires accuracy and speed. Students must perform the manipulation (deleting, substituting) within two seconds to ensure automaticity with that process. Students' ability to manipulate sounds correctly and with speed correlates with more excellent word reading proficiency. Just as with cementing new decoding patterns, the ability to hear and manipulate sounds within words becomes automatic, though the number of exposures different students need will vary widely.

  A free comprehensive phonemic and advanced phonemic awareness program, complete with assessments for grades pre-K–2, was developed from current research findings. Commissioned by the Tennessee Department of Education, "Sounds First" is available through these portals: TN DOE, Achieve the Core, Reading Done Right. Guidance is built in on responding to assessment results to provide differentiated practice for all students, as well as moving students who have demonstrated mastery through the sequence more quickly.

- **Teach students how to use context when unsure of the word's pronunciation.** When students come to an unknown word, their first attempts at recognition must be through decoding. If in doubt, predicting by context is a valid strategy (Ehri, 2014) *provided the reader then returns to the word to decode it*. Words can become sight words when read in context (within connected text) and out of context (in puzzles, games, lists, worksheets). But not if their phonic patterns are not noted and internalized. New encounters with words are learning opportunities for students to add new words to their sight word vocabulary provided they are given adequate and research-based processing experiences with phonics patterns. We know that students can recognize words through multiple means. However, when students skip words or use context to identify a word without returning to decode, they may comprehend the passage. Still, they will not bond that skipped or context-derived word or the phonics patterns within the word to long-term memory. For students to use that unknown word as a teaching opportunity, *students must return to the word to read (again aloud if possible)*, spell, and note the letters or combination of letters forming the phonemes (sounds) that make up the word.

- **Build syntactic awareness:** Share (1995) cited many studies that show that syntactic awareness measured by sentence correction supported students' decoding. The idea here is that instruction with syntax asks students to rephrase sentences while maintaining meaning, deconstructing longer sentences, combining two shorter sentences into longer sentences, turning questions into statements, and turning statements into questions. All of these

activities support decoding ability. These same activities support comprehension.

- **Grow students' ability to use phonics' knowledge to read words and spell them:** Knowledge of major spelling/sound correspondences of the writing system aids students—even with irregular words. Share (1995) noted that very few irregular words are entirely irregular; they have decodable sections! Thus, providing students with opportunities to learn the regular phonics patterns strengthened students' decoding and ability to produce words spelled accurately across the board. For example, the word *often* is undoubtedly irregular, but the f and n make the same sounds they usually do.
- **Foster understanding of the articulatory gestures:** When students learn how the mouth moves to form phonemes, they are more likely to retain these and correctly reproduce them when reading new words (Ehri 2014). In essence, instruction in these articulatory gestures helps students develop a more substantial base in phonemic awareness and, ultimately, decoding and word recognition. There is obvious value for English learners, in particular, to make this habitual practice in all early-grade classrooms and in any setting where newcomers are working to understand the alphabetic code in English.
- **Practice spelling:** Ehri (2014) wrote, "When readers see a new word and say or hear its pronunciation, its spelling becomes mapped onto its pronunciation and meaning. These mapping connections serve to 'glue' spellings to their pronunciation in memory." Processing the meanings of words bonds semantic connections to the word units as well.

2. FOCUS ON SUPPLYING THE FOUNDATIONAL SKILLS (PHONEMIC AWARENESS AND PHONICS) NECESSARY FOR READERS TO GROW THEIR SIGHT WORD VOCABULARY:

As noted above, Share (1995) looked at how students employed foundational skills to grow their sight word vocabularies. How many repetitions are needed depends on natural variations in students. For anyone, though, less familiar words will take more repetitions to become a sight word, another tribute to the value of infusing students with many opportunities to build their vocabularies (Accelerator #3). Some students will need more time on the page. Some studies (Landi et al., 2006) have shown that sight word acquisition is more robust out of context. If a student is learning the word mistake out of context, she only sees the word and must focus solely on its phonics patterns to decode it, whereas, in context, she might not focus on these patterns as intently or possibly not at all. This is why the now-debunked popular three-cueing system did such damage. By not prioritizing decoding first, students too often did not focus on the phonics at all. But, of course, in-context reading is what all this learning is aiming for! In other words, "both-and" practice options would be helpful, and any solid, systematic, structured foundational skills program provides them.

OPPORTUNITIES FOR PERSONALIZATION?

Yes! Fertile ground for research-based personalization exists here, and many are available.

As noted, students will vary in how many repetitions they need to learn phonics patterns. Personalization can address this essential skill. Some students will also respond more to relatively straightforward activities and exercises such as worksheets; others to games, puzzles, and wordplay; and yet others to competitive versions of the same. We strongly recommend using the additional practice options available through a structured, systematic foundational skills program. If ancillary materials are still desired, use

[5] Reminder: We are using "sight words" as cognitive scientists refer to it. Cognitive scientists define sight words as automatically retrieved—within a quarter of a second!—once students have decoded them successfully some number of times (again, how many depends on the student). In other words, students recognize words on sight, effortlessly, and automatically without decoding. NO memorization is involved.

a credible publisher such as Open Up Resources for its research-proven OneTab resource, or Educators Publishing Service for paper-and-pencil or digital practice materials.

The excellent news is that no statute of limitations exists on growing students' sight word vocabulary. No matter how old, all students will expand their sight word vocabulary whenever they decode words correctly, see a word, and hear it read correctly. These are vital implications for older students who are learning to speak and read English for the first time.

3. GROW STUDENTS' SIGHT-WORD[5] VOCABULARY:

As noted in 2000, the National Reading Panel identified 98 studies that used repeated reading to improve oral reading fluency.[6]

OPPORTUNITIES FOR PERSONALIZATION?

Absolutely! Fluency practice can take many low-tech, more interactive forms: choral reading, budding reading, and reading aloud grade-level texts while students follow along. All of these practice opportunities need to be differentiated and personalized, so students who will benefit are the students who are getting these opportunities.

See Achieve the Core's fluency packets for customizable grades 2–12 fluency support. Make sure that students have opportunities to see themselves and their experiences positively affirmed in the texts they will be reading and practicing with. Make sure that the fluency practice includes texts that represent diverse perspectives, histories, and identities.

Focused tech-enabled programs like Read Naturally are easy to use and provide streamlined feedback to both student and teacher. Sophisticated newcomers like Amira or Mindstar Books show promising levels of customized feedback through the use of AI.

Teachers can use phones to record readings of texts, then send them to students to listen to. Students then practice with the same texts and send back to partners in working in pairs or groups. Though teachers can limit this practice to students who need fluency supports, all students often want to do it.

Public speaking can and should be highly personalized and is one of the few areas where student choice and content linkages can cross over to foundational skills mastery. Students all deserve to be confident, fluid public speakers. The practice to become skilled is a terrific accelerator of reading fluency.

[6] Note that, particularly for older students, it is vital for student agency that anyone who does not yet have fluency with grade-level text be provided clear information about how to improve and why a given intervention or practice works. Second, adults must stay present, acting as coach and encourager of student efforts. Without such support and encouragement, even the most glamorous intervention will fall far short.

WHAT HAPPENS NEXT?

Once you have identified that you want to pursue a personalized approach and you have determined that it *is* tangibly tied to one or more of the literacy accelerators, ask yourself whether it:

1. **Advances the right content for your students?**
2. **Promotes equity and counteracts bias in both the assignment and delivery of the chosen instruction?**
3. **Offers opportunities to elevate student interest or agency in their own learning?**
4. **Is easy to use and implement?**

(*See the Consideration Questions (Appendix A) for more detailed reflections.*)

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Growing Knowledge Matters. A Lot.

VIEW RECOMMENDATIONS

OVERVIEW

Research is emphatic that reading ability and knowledge about the world (and words) are tightly connected. Authors assume their readers know things, so readers knowing things is a crucial component of readers' success and continued comprehension gains. The effects of neglecting knowledge building on many students have been significant and lingering. More than a quarter century of research supports the importance of general knowledge to proficient comprehension. Dochy et al. (1999), in a review of 183 articles, books, papers, and research reports related to prior knowledge, concluded, "Indeed, research has indicated that it is difficult to overestimate the contribution of individuals' prior knowledge to reading comprehension."

Successful reading is not a skill or, indeed, not only a skill. Reading comprehension doesn't transfer text-to-text like that. For example, it is unlike learning the skill to play chess with one set and then playing chess with another set. A student showing great "skill" with a text about farms may not show that same "skill" when reading a text about a less familiar topic, say Samurai warriors. That's because the knowledge (and vocabulary demands, among other factors like sentence and text structure) are different in the two texts. A student who lacks knowledge of Samurai will be less equipped to grapple with a text on it. Of course, instructional approaches can support students in comprehending texts about topics they know less about.

Successful reading is not passive. Essentially, as a proficient reader moves along a text, she absorbs the text's ideas and integrates them with her knowledge to form a mental model (Accelerator #5) of the text (Kintsch, 2018). As she continues to read, she updates the model as needed based on new information in the text and new or richer connections to her knowledge. The reader constructs a deeper and broader understanding through this process.

> Reading comprehension doesn't transfer text-to-text like that.

But knowledge does more than aid students in building a mental model; it fills the gaps in what the text leaves unsaid. Take this excerpt from a childhood favorite, *Charlotte's Web*:

> *"Where's Papa going with that ax?" said Fern to her mother as they were setting the table for breakfast. "Out to the hog house," replied Mrs. Arable. "Some pigs were born last night." "I don't see why he needs an ax," continued Fern, who was only eight. "Well," said her mother, "one of the*

pigs is a runt. It's very small and weak, and it will never amount to anything. So, your father has decided to do away with it."

Students unfamiliar with the meaning of *ax*, *hog house*, *runt*, "*amount to anything*," or "*do away with it*" would struggle to understand what is happening in this snippet. On the other hand, if students have all the knowledge the author has assumed, inferences will be automatic. They will quickly make a bridging inference back to the ax (realizing it will be used to kill the pig/runt and identifying with Fern's horror). This brief example clarifies the role of prior knowledge in filling gaps in the text. It also explains that this process is not limited to informational texts since this example is highly narrative. No author includes every detail, regardless of their desire to make content accessible. If they were to do so, the resultant writing would be so ponderous as to be unreadable or uninviting.

HOW DOES KNOWLEDGE BOLSTER COMPREHENSION IN OTHER WAYS?

Building students' knowledge needs to begin in earnest as soon as students enter school and progress throughout. Knowledge facilitates reading, but researchers have found that it needs to reach a certain threshold to do so (O'Reilly et al., 2019). Below that threshold, "a lack of knowledge becomes a barrier to comprehension" (O' Reilly et al., 2019, p. 1344).

Knowledge helps readers understand a text's meaning; it also supports students' reading comprehension in other ways. Knowledge helps readers recall information more coherently and distinguish between less essential and more important details in a text (Stahl, 1991). Knowledge is vital in assisting readers in processing less coherent texts. (McNamara & Kintsch, 1996). It can help compensate for decoding weakness (Accelerator #1). This finding holds even when students are learning to read in English from another language base (Raudszus et al., 2019). Knowledge also reduces memory demands because it allows readers to "chunk" information efficiently. Recht and Leslie (1988) give an example of this in what has come to be known as "the baseball study." Knowledge in fiction texts helps readers understand what to expect, which supports comprehension more often than not. (Uyl & Oostendorp, 1980). Studies show that knowledge and vocabulary (Accelerator #3) are two sides of the same coin; vocabulary grows alongside knowledge. The more you learn about the world, the larger your vocabulary gets. The more you know about the world and the more words you know, the better comprehension you demonstrate because of that knowledge (Whipple 1925; NCES, 2012).

> "...a lack of knowledge becomes a barrier to comprehension"

Building knowledge is one of many reasons teaching students how to read by grade 2 (Accelerator #1) is crucial. And what students read should frequently be wrapped in plenty of conversation with peers and be as active as possible in the classroom. As students learn more, they will have greater access to more and richer texts. To date, instruction has focused far more on matching "just right" texts to students, teaching discrete strategies, or even isolating standards to focus on one at a time. None of these efforts has resulted in the kind of widespread reading achievement we seek and students deserve. Nor can those isolated skills transfer to other texts, particularly when the knowledge and vocabulary demands they contain are too great. The contrast is enormous between the purpose of knowledge-based reading—which is to understand and learn from what is read—and leveled reading programs, where the primary goal is to practice a target strategy or standard. Growing students' general knowledge of the world from reading (or being read to) a volume of texts at a range of complexity levels provides students with a trove of knowledge to reference when they read.

Qualitative data from the Knowledge Matters Tour tell us that teachers are reporting motivation in their weakest readers since they have switched to anchoring literacy study in new knowledge-building curricula that emphasize the growth of science and history knowledge. These core curricula that have come on the market since 2015 are the sine qua non of building knowledge. These curricula are already starting to show improved student outcomes on standardized assessments (Bocalla et al., 2019; Nichols-Barrer & Haimson, 2013;

Pasquarella, 2017; Walpole et al., 2017; Dolfin et al., 2019). Better results make sense because a knowledge-based program magnifies the effect of unitary, conceptually coherent text sets for expanding student knowledge or vocabulary growth (Purcell-Gates et al., 2007; Vitale & Romance, 2012; Zwyca & Gomez, 2008). In other words, these programs not only employ conceptually coherent readings but also integrate writing (Accelerator #4), discussions, videos, and a myriad of activities around the topic.

> Knowledge building curricula are already starting to show improved student outcomes on standardized assessments... these findings were found directly applicable to older Latinx and African American students.

A host of other studies show that integration of content-related texts into instruction leads to more substantial results for students on standardized tests. (Morrow et al., 1997; Vaughn et al., 2013; Vitale & Romance, 2012; Tyner & Kabourek, 2020). These findings were found directly applicable to older Latinx and African-American students in one study where Zywica & Gomez (2008) integrated literacy activities into science classes in large big-city high schools. Some researchers also report students experience higher enjoyment of the material taught (Vaughn et al., 2013), which cannot be overlooked as a valuable outcome. This follows Guthrie et al's. (2007) research that shows that knowledge-based literacy study increases student motivation.

There are several approaches mainstream teachers can adopt to address ELs in particular. At critical points during lessons, home languages can be tapped to help facilitate knowledge acquisition (Bunch et al., 2012; Goldenberg, 2013).

ELs can research the unit topic or read (or listen to) in their home language the text that they'll be reading in class. ELs can be given time to discuss and clarify their ideas about texts or topics under study in their home language with fellow speakers. Teachers can offer ELs bilingual glossaries. Students' interests, motivations, and prior knowledge can point teachers to excellent text choices and to what pedagogical supports to employ for engaging ELs with complex texts and rigorous tasks (Bunch et al., 2014). Another scaffolding approach endorsed by EL experts is to provide ELs with auxiliary, more-accessible texts (including those in the students' first language) to build their background knowledge of the subject prior to their encountering grade-level complex text: "If the [main] text contains cultural, historical, or thematic information ELs are unlikely to have acquired, they can read short supplementary texts to help them acquire such knowledge" (August et al., 2014, 5). Accessing additional resources such as illustrations, photographs, short video clips, demonstrations, and the like is another way ELs can get a leg up on building knowledge (August et al., 2009; Valdés et al., 2018).

> At critical points during lessons, home languages can be tapped to help facilitate knowledge acquisition.

HOW CAN WE EXPAND STUDENTS' KNOWLEDGE BASE POWERFULLY?

In a seminal study, Cervetti, Wright, and Hwang (2016) found that the single most robust method for rapidly growing students' vocabulary (Accelerator #3) was reading conceptually related texts that cohere together to create a picture of a topic—more than reading unrelated texts. Landauer and Dumais (1997) found similar results with computational models that matched human word learning. It isn't easy to overstate the significance of these findings. Not only does vocabulary contribute to comprehension, but this study has implications for knowledge-based text sets. It also increases students' knowledge, essentially allowing one

instructional method to do double duty. Reading a volume of texts on conceptually related topics is one of the most efficient ways to grow students' knowledge and accelerate literacy outcomes. The compounding impact on knowledge and vocabulary growth is immense when schools dedicate an entire year's worth of ELA study to conceptually connected units and text sets. Now imagine the effect on students' vocabulary and knowledge growth if the same approach were applied in kindergarten and extended through 12th grade.

Recommendations

Top opportunities for personalization spring out from this core and are myriad.[1] That's why the leadoff approach to fortify the knowledge accelerator is to:

1. CREATE SETS OF CONCEPTUALLY CONNECTED TEXTS/MEDIA FOR STUDENTS TO READ:

These sets can either mirror the conceptually related shorter texts used in the Cervetti, Wright, and Hwang study or be text sets built around the topics of challenging grade-level anchor texts that will build background knowledge and motivation for accessing the anchor text. Lupo et al. (2018) pioneered the Quad Set approach. Success with the first text in the set facilitated students' comprehension with subsequent texts. The approach changed teacher mindsets about students—especially about those who tested below grade level. They were able to access grade-level content. It also increased the time students spent reading in the classroom and increased student motivation. Importantly, high school students were the subject of her study.

OPPORTUNITIES FOR PERSONALIZATION?

Yes! Tremendous opportunities to accelerate literacy outcomes exist—both human and tech-enabled—that are easy to use, easy to implement, and driven by students' interest and choice. Here are five:

- Teachers can create connected text sets or tap into existing ones for their students to read, either related to the anchor texts' topics and themes or for students to choose based on their interests.
- Teachers can organize their classroom libraries or book baskets by topic rather than by the level of books and let students choose to read about the topics they are interested in. To see how, go here.

[2] The products or approaches named here are called out because they are known to the authors and align to the research supporting this accelerator. They are examples that could work, not an exhaustive list. Careful evaluation against the Consideration Question and vetting should be undertaken before making any decisions about the utility of any of these products or approaches for your needs.

- Students can determine an essential question they want to explore on a topic they choose, either independently or in a small learning community of their peers.
- Tech-enabled programs can be built or customized to allow students autonomy to read or research a volume of texts on a topic at varying levels of difficulty. See Readworks Articles a Day sets (all resources free with registration) or Mindstar Books or Simple Wikipedia for examples of existing or easily modifiable resources. Such topic selection could be teacher directed or could be focused on particular areas of interested targeted by students themselves.
- Achieve the Core features complete text set lessons, as well as resources that explain how to build text sets and incorporate reading on a variety of topics. While text sets are not (yet) a component found across all literacy programs, they are becoming more and more common (see a recent review of text set resources by the Fordham Institute).

2. DESIGN CLASSROOM LEARNING TO ENHANCE THE KNOWLEDGE AND EXPERIENCES THAT STUDENTS COME TO SCHOOL WITH—KNOWLEDGE ROOTED IN THEIR LIVES AND CULTURAL TRADITIONS.

Most curricula—even the new knowledge-based curricula—are not yet diverse enough in their text selections, the study of those texts, and chosen content to affirm the identities of all students rather than marginalize or, worse, oppress. Lots of work is being done in this area, so look for well-regarded groups already doing this work.

OPPORTUNITIES FOR PERSONALIZATION?

Yes! Your budget and the sky are the only limits. Schools need options designed to honor and accommodate variations in students' language and cultural heritage and other identities in ways that affirm rather than shelve their students' sense of self. For an example of a bookseller that has always attended to expanded representation and identities, look at Lee & Low's offerings.

To create learning opportunities that honor and promote students' variations in language and cultures, personalization can be a means to anchor learning in students' experiences. It can mean going beyond curriculum mandates as a catalyst for expanding students' knowledge through a broader, more racially and ethnically expansive set of text selections, research, and projects, both human and tech-enabled. Publishers could design culturally diverse modules for students and teachers as indeed some already do. Teachers could design options that are culturally responsive to the very students in their classroom while continuing to expose students to identities other than their own.

Following are some additional methods to boost the knowledge accelerator, though not all are conducive to personalization:

3. EXTEND LUPO ET AL.'S FINDING TO READING BOOK-LENGTH INFORMATIONAL TEXTS THAT FOCUS ON A TOPIC.

When students do so, knowledge referenced in each chapter helps support comprehension of the next chapter. The author "designs-in" coherence: the voice, syntax, and word choice all emerge from one mind with a vision and purpose that hold steady for the book's duration. Under this scenario, knowledge (e.g., information, ideas, events) is assembled all in one place for students.

OPPORTUNITIES FOR PERSONALIZATION?

It depends. If the books are grade-level complexity, the support of the teacher's coaching and modeling, and the collective learning available via classwide discussions are essential for giving every student access to the rich information contained in the full-length book. If students are reading on related topics to the central focus, and books are available at a variety of reading levels, then students could work in more individualized or small-group ways. Too, students could be encouraged to seek answers to their own lines of inquiry. Note also that full-length works are valuable opportunities to expand the breadth of focus to be more inclusive of more identities and perspectives than might be available through the core curriculum.

4. READ ALOUD TO STUDENTS—ESPECIALLY IN THE EARLY YEARS.

The more students get read to, the more they will learn. For most younger students, listening comprehension far outpaces reading comprehension. Estimates are that reading comprehension does not catch up to listening comprehension until well after third grade (Sticht & James, 1984). Yet, remunerative as it is for building vocabulary and knowledge, strengthening comprehension and language acquisition for English learners or older students with reading gaps, and enjoyable for teachers and students alike, reading aloud is often neglected. Its power as a pedagogical pillar has neither been understood well nor exploited by curriculum designers or teachers. Imagine reading *Charlotte's Web* to students in kindergarten, so all its rich details of country life become part of their background from then on! That learning will yield accelerating returns and motivate students to read it independently once they learn to read (Accelerator #1).

OPPORTUNITIES FOR PERSONALIZATION?

With some exceptions (primarily listening while following along), not recommended. Classrooms are centers of cultural exchange and co-learning. Listening to content-rich read-alouds, above all else, must be a social endeavor, not one practiced predominantly in isolation.

Content-rich, culturally expansive read-alouds should happen whole-class so students can talk with and learn from each other and engage! As long as these whole-class opportunities aren't eclipsed, here are some personalization opportunities:

- Teachers can prepare recordings of read-alouds, allowing students to refamiliarize themselves with the readings to the class. This strategy works well for remote learning.
- Tech-enabled programs could include a series of read-alouds with subtitles to allow students to grow their vocabularies and make stronger connections between the spoken and written words. This process would simultaneously strengthen both reading fluency and student access to complex text but should not be a substitute for a whole-class read-aloud. Microsoft's Immersive Reader could easily be activated to work well for this range of supports.

WHAT HAPPENS NEXT?

Once you have identified that you want to pursue a personalized approach and you have determined that it is tangibly tied to one or more of the literacy accelerators, ask yourself whether it:

1. **Advances the right content for your students?**
2. **Promotes equity and counteracts bias in both the assignment and delivery of the chosen instruction?**
3. **Offers opportunities to elevate student interest or agency in their own learning?**
4. **Is easy to use and implement?**

(See the Consideration Questions (Appendix A) for more detailed reflections.)

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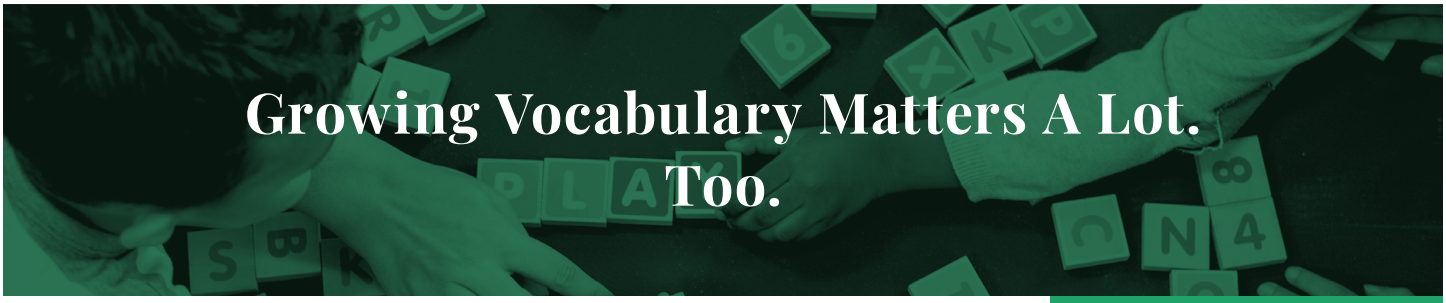

Growing Vocabulary Matters A Lot. Too.

VIEW RECOMMENDATIONS

OVERVIEW

It's not hard to recognize that reading has a lot to do with words! As Marilyn Adams says, "Words are not just words. They are the nexus—the interface—between communication and thought. When we read, it is through words that we build, refine, and modify our knowledge. What makes vocabulary valuable and important is not the words themselves so much as the understandings they afford" (2009, p. 180).

Researchers have closely tied vocabulary to reading comprehension for nearly a century (Whipple, 1925). After looking at several assessments, researchers Chall and Jacobs (2003) noted that vocabulary and comprehension scores are so closely related that there is almost no reason to have separate assessments. One of the major studies conducted by the National Assessment of Educational Progress looked at the vocabulary results from the 2009–2011 NAEP assessment and concurred: The study found a strong correlation between vocabulary and comprehension. The study also pointed to stark disparities between students of differing SES and racial groups—a distressing and unacceptable finding (NCES, 2012).

> There are strong correlations between vocabulary and comprehension, so strong that there is almost no reason to have separate assessments.

Works by Stanovich (1986) and Stanovich and Cunningham (2001) further corroborate the importance of vocabulary. They show that vocabulary levels play an enormous role in predicting differences in reading levels and acting as a major influencer in the educational "Matthew Effect," wherein the academic-world rich get richer, and everyone else suffers with respect to proficient reading. More recently, Oslund *et al.* (2018) examined the relationship between vocabulary and comprehension while focused primarily on adolescent students of color and students who received free or reduced lunch (study sample was 22 percent Black, 43 percent Hispanic, 33 percent White; 67 percent of all students were eligible for free or reduced lunch). The study found vocabulary knowledge played a primary role in explaining individual differences in adolescent reading comprehension, and these results, distressingly, correlated to race and SES. Vocabulary matters, and growing it for students who are still not getting what they need to thrive in school is a crucial instrument to address educational inequities.

> Vocabulary matters, and growing it for students who are still not getting what they need to thrive in school is a crucial instrument to address educational inequities.

HOW DOES VOCABULARY DRIVE COMPREHENSION?

The feature of complex text that causes students the most significant difficulty is vocabulary (Nelson et al., 2012). Having to stop to determine the meaning of too many words in a text slows readers up; the problem gets much worse when faced with ever-more complex text. Not knowing words on the page is debilitating.

Both vocabulary depth and breadth are independently correlated with comprehension (Binder et al., 2017). Breadth and depth, however, support different aspects of comprehension (Cain & Oakhill, 2014). Breadth encompasses the number of words in a student's mental dictionary or lexicon. Those are words for which that reader has either a general or more precise sense of their meaning. Most instruction in vocabulary has traditionally addressed the breadth of vocabulary—building students' lexicons. Vocabulary breadth helps students make the local inferences that alert them to what the text is saying at the sentence and paragraph level.

On the other hand, vocabulary depth indicates how much a student knows about a given word, including its synonyms, multiple meanings, and morphology. For example, a student might know *flurry*, as in snow flurries (breadth), but not a "flurry of activity" (depth). They might be aware of *ground*, meaning the soil or dirt (breadth), but not *ground* as in "Her ideas are well-grounded"; "he ground his teeth in despair"; they stood their ground as their enemy approached" (depth). Specifically, Cain and Oakhill (2014) showed that vocabulary depth might play a unique role in making global inferences that support comprehension. Global inferences support meaning at the whole-text level for concepts like setting, character, theme, and central ideas. These global inferences are essential to constructing Kintsch's "mental model" (Accelerator #5) of a text.

> But interventions aimed solely or primarily at vocabulary development in isolation are not likely to yield great results except for the impact on those words that are directly taught. Vocabulary is grown best when new words are learned in context.

A series of studies (Perfetti, 2007) has shown that the more a student knows about words, the stronger a reader they are. In addition to the depth of vocabulary already called out (multiple meanings, morphology), Perfetti has shown that knowledge of spelling, pronunciation, and part of speech about any given word all correlate with more excellent reading proficiency. Though we tend to think of a word as a unit or a single thing, it is truly made up of several elements: its meaning, any related meanings or senses, its parts (phonemes, syllables, prefix, suffix, root), spelling, pronunciation, part of speech (though often determined by context) and even its history or etymology. The more students know about a word, the more likely they are to be proficient readers and gather its nuance when they encounter the word while reading. Even more critical, this habit of paying attention to particular words—of finding them interesting to linger on—has not traditionally been supported through direct teaching as much as it should be.

But interventions aimed solely or primarily at vocabulary development in isolation are not likely to yield great results except for the impact on those words that are directly taught. Vocabulary is grown best when new words are learned in context. While no one can deny the importance of vocabulary scaffolding to support

this learning, it's important to emphasize that teachers should envision vocabulary instruction—a study of words, phrases, and clauses—as supporting the broader goal of developing greater reading comprehension. That would seem to be obvious, but the reverse happens, with teachers planning content instruction around meeting particular vocabulary aims—a risk in instructing ELs in particular (Bruna, Vann, and Escudero 2007). Not surprisingly, research is emphatic regarding the benefit of engaging ELs in vocabulary instruction—especially in tier two (general academic) vocabulary (Beck et al., 2013)—over the course of multiple lessons (Baker et al., 2014). ELs are becoming literate in a language they are simultaneously learning to speak and understand. Thus, they also are aided by a focus on everyday words (tier one) that are essential to understanding the core content of texts. These are words that native speakers have learned through everyday speech that ELs may not yet have encountered.

Successful approaches for vocabulary instruction enable students to come to know words and phrases through the discovery of their literal meanings as well as their connotations, syntactical uses, and morphological structures. Providing students with frequent and varied opportunities to use newly learned academic vocabulary—beyond memorizing definitions—cements new words and phrases into their working knowledge. Requiring students to use targeted academic words and phrases anchored in the texts they're reading as part of their writing and oral discourse and processing increases students' experiences with the words and phrases. Such understanding, in turn, provides students with the skills to learn new words and phrases on their own and to acquire the knowledge contained in texts that use academic vocabulary.

> ELs are becoming literate in a language they are simultaneously learning to speak and understand. Thus, they also are aided by a focus on everyday words (tier one) that are essential to understanding the core content of texts. These are words that native speakers have learned through everyday speech that ELs may not yet have encountered.

HOW CAN WE ACCELERATE VOCABULARY?

The more words you have some understanding of, or at least, as noted above, some knowledge of the most common ways those words are used, the larger your vocabulary and the better your comprehension. Anderson and Nagy (1992) note that proficient students learn 2,000 to 3,000 words a year. That's a lot of words—too many to be learned just through direct instruction.

Let's define what we mean by direct and indirect instruction:

- Direct vocabulary instruction includes games, puzzles, workbooks, riddles, work with dictionaries or thesauruses, stopping to discuss an interesting word choice while closely reading; any lessons that include any combination of these. In addition to learning the meaning of words taught, direct instruction makes students more aware of words in general and, therefore, is more likely to focus on words they are not sure of while reading.
- Indirect instruction refers to learning the meaning of words from context while reading independently. The context is the other words in the texts students are reading and the topic or any knowledge demands the text presents. The more a student knows about these topics, the more she is likely to determine the meaning of unknown words.

Though not often noted, these two approaches to acquiring vocabulary have great synergy. The greater awareness (Accelerator #2) students have about a topic, the more likely they will notice words they do not know or are less sure of when they see them while reading independently and attempting to determine their meaning (Beck et al., 2013). This vocabulary knowledge can add to a healthy standard of coherence (Accelerator #5).

Recommendations

Below are a few possibilities that can take advantage of the research, so students realize gains in their store of vocabulary, which, in turn, will make them better readers. Here is where it gets really interesting because not all reading is created equal in yielding vocabulary growth! Again, we begin with the vocabulary-building approach with the maximum payoff:

1. **CREATE OR TAP INTO A SERIES OF TEXTS CENTERED ON CONCEPTUALLY RELATED TOPICS TO GROW TIER-TWO VOCABULARY AS MUCH AS FOUR TIMES MORE (IN THE NUMBER OF WORDS LEARNED) THAN READING THE SAME QUANTITY OF TEXTS ON UNRELATED TOPICS** (Landauer & Dumais, 1997)

Tier-two words are critical words that recur across texts regardless of content or subject matter (e.g., variety, especially). Specialized words that belong to a domain (e.g., photosynthesis, electoral college) are known as tier-three words. Tier-two terms are not associated with any one domain or subject area, and they are more sophisticated than everyday tier-one words (e.g., family, street, cat).

A seminal study by Cervetti et al. (2015), first pointed to in the knowledge section (Accelerator #2), reaffirmed these findings. Cervetti and Wright studied two groups of students: One group read a set of six conceptually connected texts about birds. The second group read six texts on six different topics, one of which was birds. The texts were modified to embed the same set of tier-two vocabulary words. It might seem counterintuitive that a collection of texts centered around one topic would grow more domain-independent (tier-two) vocabulary, but it did. The study showed that reading a set of connected texts on one topic led to a significant gain of tier-two vocabulary compared to reading the same number of texts on diverse topics. In other words, the students who read the six texts about birds learned more tier-two vocabulary words than students who encountered the same words but in a set of unrelated texts. Knowledge and vocabulary have a reciprocal relationship. While both aid comprehension (greatly), they

also act on each other. Gaining knowledge (Accelerator #2) aids the development of vocabulary, and growing one's vocabulary increases a reader's store of knowledge.

OPPORTUNITIES FOR PERSONALIZATION?

You bet! Tremendous opportunities to accelerate literacy outcomes exist—both human and tech-enabled—that are easy to use, easy to implement, and driven by students' identities, interests, and choice. One strategy—creating text sets—can serve double duty: building vocabulary and expanding students' knowledge (Accelerator #2). Teachers can make these sets, or tap into existing tech-enabled programs to allow students autonomy to read or research a volume of texts on a topic at varying levels of difficulty. Students should also be free to pursue topics and information that is culturally relevant, so the core curriculum is expanded to include multiple identities and perspectives. See Readworks Articles a Day sets (all resources free with registration) or Mindstar Books or Simple Wikipedia for examples of existing or easily modifiable resources. Such topic selection could be teacher directed, or could be focused on particular areas of interests targeted by students themselves. These text sets should, whenever possible, increase in complexity gradually, with earlier texts "bootstrapping" the later texts, as Adams (2009, 2011) and Lupo et al. (2018) suggest. The beauty of text sets is vocabulary does not have to be taught only directly. Students can access these texts with minimal teacher support. Landauer et al.'s and Cervetti et al.'s work shows that the word learning will be provided as an indirect by-product of the topic learning (1997, 2016).

2. EMPHASIZE THE CAREFUL, FOCUSED, COMMUNAL READING OF RICH, COMPLEX TEXTS.

Close reading is another strategy and one of the most potent tools instructors have to drive depth-of-vocabulary instruction. This strategy requires that teachers select a small number of high-value words and phrases from grade-appropriate texts. By discussing the deeper meaning of words in context, how that word is similar to or different from other words (why *confess* and not *admit*, *disclose*, *reveal*...) and why the author chose those words both enhances a reader's understanding of the text and helps retain that new word at a deeper level. Biemiller (2001), whose work addresses building breadth of vocabulary, has shown that in the context of texts students are reading (or hearing), they can learn many concrete words (e.g., *cabinet*, *host*, *remote*, *skirt*). They also can learn words that are less-common synonyms for words students likely know (e.g., *humongous, gregarious, typical, expedient*) if teachers quickly "drop-in" definitions during reading. His work has shown that students retain these words with as little as 30 seconds devoted to learning about a word.

OPPORTUNITIES FOR PERSONALIZATION?[1]

Yes, in some ways. Learning to make sense of rich, complex text must frequently be a social endeavor; not one learned predominantly in isolation where students are left to their own devices. There are tech-enabled programs, however, that can link to definitions of words. When students are reading an online text and don't know a word, they can click on it, and the definition will come up. Pictures or videos would enhance those definitions even more. Add to these Wordsmyth, which provides all kinds of support with one click, and freethesaurus and the Microsoft Immersive Reader, and this is a case in which students would personalize for themselves—they get to choose which words to click on. Or give students responsibility to uncover the meaning of unknown words encountered in print by teaching them how to load text excerpts into the Academic Word Finder to see what academic vocabulary in the

[1] The products or approaches named here are called out because they are known to the authors and align to the research supporting this accelerator. They are examples that could work, not an exhaustive list. Careful evaluation against the Consideration Question and vetting should be undertaken before making any decisions about the utility of any of these products or approaches for your needs.

text are grade-level or above words, and then use an online word or picture dictionary to discover the meaning and etymology of unknown words.

As Baker et. al. (2014) explains word and phrase definitions can also be enhanced using tools such as graphic organizers and other visual strategies to tie a word or phrase to concrete examples and non-examples (e.g., *ant* and *baby* as non-examples of *enormous*). Identifying cognates in other languages that have a common etymological origin with English counterparts (e.g., *actividades* and *activities*, *centro* and *center*, *investigación* and *investigation*) is another way to clarify definitions of words and phrases.

Following are some additional methods to boost the vocabulary accelerator, with plenty of personalization opportunities:

3. ATTEND TO MORPHOLOGY STUDY AS A POWERFUL DIRECT INSTRUCTIONAL TOOL.

Nagy et al. (1989) estimated that in the middle grades and beyond, "more than 60 percent of the new words that readers encounter have relatively transparent morphological structure—that is, they can be broken down into parts." Cultivating awareness and understanding of morphology supports the independent acquisition of new words. Instruction in morphology includes "playing with words" by adding, removing, or substituting affixes to roots, seeing how affixes change the meaning and/or part of speech of a word, and using the same target word in different contexts (Binder et al., 2017). Again, the foundational reading support (Accelerator #1) of scrutinizing a word to discover its phonemic parts, its syllabic and phonic structure, and the meaning of its parts will help build depth of vocabulary. It will also solidify automatic word recognition in students whose foundational reading skills are not yet complete.

OPPORTUNITIES FOR PERSONALIZATION?

Yes! Tremendous opportunities to accelerate literacy outcomes exist—both human and tech-enabled—that are easy to use and easy to implement.

Imagine the games, puzzles, workbooks, and riddles that students could use to practice using word parts to discern meanings independently. Teachers can't provide instruction in the thousands of vocabulary words and phrases they need for academic success. Tech-enabled programs can teach readers to use word parts to predict a word's meaning and then use context to confirm or correct that prediction. See Common Sense Education for well-vetted reviews.

4. CREATE OPPORTUNITIES FOR STUDENTS TO USE THE WORDS THEY ARE LEARNING IN THEIR WRITING (ACCELERATOR #4) AND SPEAKING.

Instruction needs to create opportunities to do just that, and personalization can help.

OPPORTUNITIES FOR PERSONALIZATION?

Yes, because prompting students to practice using newly learned vocabulary is grounded in what we know about how the brain learns and contributes to the long-term flourishing of reading comprehension.

Opportunities to use newly learned academic vocabulary—beyond memorizing definitions—cement new words and phrases into their working knowledge. Requiring students to use targeted academic words and phrases anchored in the texts they're reading as part of their writing and small-group discussions

can increase students' experiences with the words and phrases. Teachers can also involve students in a range of fun and compelling games—human or tech-enabled—that are intellectually meaningful, such as Free Rice, Vocabulary Spelling City, or crosswords and charades, while increasing their exposure to high-value words and phrases. But again, these activities should provide a useful review of words and phrases previously taught.

WHAT HAPPENS NEXT?

Once you have identified that you want to pursue a personalized approach and you have determined that it is tangibly tied to one or more of the literacy accelerators, ask yourself whether it:

1. **Advances the right content for your students?**
2. **Promotes equity and counteracts bias in both the assignment and delivery of the chosen instruction?**
3. **Offers opportunities to elevate student interest or agency in their own learning?**
4. **Is easy to use and implement?**

(*See the Consideration Questions (Appendix A) for more detailed reflections.*)

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Text-Based Writing Has Untapped Power

VIEW RECOMMENDATIONS

OVERVIEW

Deriving evidence from the text in a disciplined, focused way has the potential to be a great equalizer, allowing students to learn about the text from each other. Asking students to write about the texts they are reading means that all readers have equal access to the same body of information (the given text).

All students can learn how to marshal textual evidence in the service of a skilled interpretation of what a text says directly or inferentially. Learning to do so is essential to students' futures. Researchers note that the task "most associated with college-level work" across the disciplines is "reading-to-write" (Flower et al., 1990, p. 4). College instructors are unanimous in citing the ability to identify, evaluate, and use evidence to support or challenge a thesis as one of the essential skills expected of incoming college students (Graham & Hebert, 2010; ICAS, 2002). The College Board (2019) conducted an extensive survey of college teachers before changing the SAT to emphasize evidence-based reading and writing. They found strong evidence that postsecondary faculty as a whole across the disciplines rated skills such as "command of evidence" as high on the importance threshold (p. VIII). Employers agree (Hart Research Associates, 2018).

The use of evidence is not unique to a certain kind of writing or even to particular disciplines. Students can defend claims about the meaning of a piece of literature with evidence from the text in English classes. In history/social studies, students can analyze evidence from multiple primary and secondary sources to advance a claim about an event or a historical figure. And in science, students can include data from lab reports and investigations as evidence in support of their findings, answering a question or addressing a problem. As Reither (2000) explained, using evidence is not merely at the core of each academic discipline but also the glue that inseparably connects the foundational academic activities of writing, reading, and inquiry. He observed that "all three are learned not by doing any one alone, but by doing them all at the same time . . ." or in other words, "ground[ing] writing in reading and inquiry" (p. 291).

Using evidence in student writing has only recently come into focus. It stems from a long-standing historical divide that placed reading and writing in separate disciplines, departments, and courses—a "divorce… that has been central to pedagogical tensions" since the 18th century (Harl, 2013, p. 30). The importance of including evidence in text-based writing has clear implications for how we teach and assess reading. Evidence runs throughout a text in patterns that reflect its organization and purpose—what Walter Kintsch (1998) has called its macrostructure (Accelerator #5). Finding, employing, and understanding the full range of evidence from texts is impossible without a pedagogy that brings reading and writing together.

HOW DOES TEXT-BASED WRITING BOLSTER READING COMPREHENSION?

Writing about texts adds power and efficacy to students' reading, rereading, and discussing each text they examine closely (Graham & Hebert, 2010). Anchoring assignments in the texts students are reading (and the topics these texts cover) gives ELs (and all students) meaningful information and ideas to write about as they extend and solidify their content learning as well as their writing skills. Writing about what one is reading through the collection of evidence forces attention and careful reading. Collecting evidence for writing gives students a payoff in the form of deepening their comprehension. Researchers who studied mainstreamed Latino English language learners in secondary school report, "It is precisely because reading and writing access similar cognitive strategies . . . that reading and writing make such a powerful combination when taught in connection with one another" (Kim et al., 2011, 7). Such assignments are superior to ones explicitly geared toward producing grammatically standard writing because decontextualized writing is much harder to negotiate than is writing on a subject one knows about. Allowing students to write about what they've learned grounds that content deeply in students' understanding.

> Writing about what one is reading through the collection of evidence forces attention and careful reading. Collecting evidence for writing gives students a payoff in the form of deepening their comprehension.

Whether pursuing their own learning goals or responding to questions or tasks presented to them by a teacher, paying careful attention to the text activates the brain while reading. Neuroscientists have shown that successful readers' brains are "switched on" in ways different from those of less proficient readers (Wolf, 2018). The more skilled students become at finding textual evidence to use in their writing and organizing it in service of presenting it in print, the better they will understand what they have read. Collecting evidence is one means of forcing attention and careful reading that can achieve deep understanding. There are several studies by Brockman et al. (2010) that found support for basing writing assignments on reading precisely because such assignments are "designed to help students learn class material" (p. 44). As most academic writing asks students to respond to what they have read, it is no surprise to discover research supporting the idea that "good writers are most likely careful readers" (ICAS, 2002, p. 15).

While citing evidence makes student writing richer and more engaging (and provides the central element in proving what they say), there are numerous other benefits. First and foremost, asking students to write about what they read simultaneously improves their expressive skills, comprehension, and ability to learn more completely from the text (Graham & Hebert, 2010). Second, reading to comprehend by setting that understanding down in writing grows students' domain knowledge (Accelerator #2). Research shows that reading "thoughtfully and critically and produc[ing] evidence" is one of the most effective ways to lead students to "make connections to related topics" and "synthesize information" (ICAS, 2002, p. 16). Capturing learning in writing is an effective way for students to solidify what they have learned. Presenting that collected evidence effectively, whether by summarizing its essence, responding to questions posed on an assignment, or developing a well-reasoned formal argument, cements understanding that too often remains nebulous unless written down.

> The more skilled students become at finding textual evidence to use in their writing and organizing it in service of presenting it in print, the better they will understand what they have read.

HOW CAN WE GROW STUDENTS' WRITING EFFICIENTLY?

The more skilled and habitual students become at finding textual evidence through close reading, the better they will understand what they have read. The more students write about texts, the more explicitly they will consider the text's contents, and the better they will consolidate its information and integrate its ideas. All of this contributes to students' confidence and efficacy regarding their abilities to express themselves in print. The regular repetition of this cycle of learning—if not daily, weekly—is what is needed.

Over time and with lots of practice, students can become better able to develop a controlling idea and a coherent focus on a topic. They also become more skilled at selecting and incorporating relevant examples, facts, and details into their writing. A sharp instructional focus on source-based writing would help integrate reading and writing. The research supports having students "articulate a clear thesis and identify, evaluate, and use evidence to support or challenge that thesis" (ICAS, 2002, p. 15).

And we should not underestimate the will of students to read. In the words of researchers Doug Fisher and Nancy Frey, "Reading has to be a thrill…students need to do something with the information they have gained from the text. . . . Comprehending means that students become active producers. One way to accomplish this is to ask students, 'What are you inspired to do?' after they read a text," (2020, p. 821). Again, as they note, choice matters—a lot.

Recommendations

Top opportunities for personalization spring out from this core mindset and are myriad.[1] That's why the first two leadoff strategies to fortify the writing accelerator are to:

1. PROVIDE STUDENTS WITH AMPLE CHOICES TO CONDUCT AND REPORT RESEARCH ON TOPICS CONNECTED TO WHAT THEY ARE LEARNING IN CLASS.

Rather than ask students to brainstorm, free-write, or otherwise reflect about a familiar topic or experience, tasks that ask students to reflect on what they are reading will boost their comprehension and literacy outcomes.

OPPORTUNITIES FOR PERSONALIZATION?

Yes! Human-enabled opportunities that can accelerate literacy outcomes are available right now to capitalize on students' interest, motivation, and identities—both in terms of what to study and how to report their findings.

Students can follow their interests to research all kinds of topics throughout the year, and should

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frequently be free to design both the process and the product of their research in ways that seem most viable and valuable to them. Topics can be connected or not to what they are reading in class, which should provide outlets to validate and learn more about their own identities and cultural traditions as well as exposing students to other perspectives. Teachers can use research assignments to introduce ideas and information that expands representation to be culturally relevant and expansive beyond the core curricular materials. Close reading itself can be treated as a "research lab," where students can develop their understanding of any manner of things connected to the "anchor texts," such as insect ecosystems, ancient civilizations, civil rights, the human body, and so on. Over time, teachers can expand the choices students have about how to share what they have learned. Fisher and Frey (2020) cite their communication with reading researcher Richard Anderson (June 30, 2018, pp, 821) about how to provide students with choices about just how to deliver their research results. They describe students assuming the role of "storyteller," "explainer," or "arguer." As they explain it, the "storyteller" uses accurate information from the texts they've read and then make the story come alive with imaginative dialogue and other material (pp. 821). The "explainer" sticks to the facts and provides the who, what, where, when, why, and how of the information. The "arguer" must select a claim for which she provides compelling reasons and evidence to convince readers to agree to her point of view. The goal is for students to personalize what to do with the knowledge they gain in meaningful and interesting ways.

2. MAKE IT EASY FOR TEACHERS TO ASSIGN FREQUENT EVIDENCE-BASED WRITING—ACROSS GRADES AND SUBJECT (Graham & Hebert, 2010; ICAS, 2002).

Practice makes perfect—the quantity of writing matters. Regular repetition of the reading-writing cycle of learning is what is needed but hard to do.

OPPORTUNITIES FOR PERSONALIZATION?

Yes! Schools need options here to accelerate students' writing abilities that are easy to use and easy to implement. New scoring technologies are on the horizon and they could be real game-changers.

Too few students around the nation are given weekly writing assignments tied to their reading. That's because the load on teachers to score and provide cogent and timely feedback often serves as a barrier to assigning frequent evidence-based writing. Enter automated essay-scoring (AES) technologies to offer teachers a feasible way to implement evidence-based writing at scale. New technologies are providing information about students' skills at marshaling text evidence. Researchers have found a close correspondence between human and AES scores (Correnti et al., 2020). Using these technologies could significantly boost student practice and relieve scoring burdens on teachers. These scoring platforms could work in tandem with teachers regularly assigning writing assignments.

Following are some additional methods to boost the writing accelerator, though not all have ready-to-go personalization opportunities:

3. PROVIDE STUDENTS WITH EXPLICIT INSTRUCTION IN ACTIVE READING TO CONSTRUCT AND EXPRESS THEIR ARGUMENTS.

Horning and Kraemer (2013) summed up the situation by declaring, "[T]oo little time is devoted to [teaching students] *how* to transfer and assimilate the readings into effective compositions" (p. 72). Teaching students explicitly how to write about the texts they read (not just assigning writing) matters: writing instruction paves the way for improved reading fluency, comprehension, and learning (Graham & Hebert, 2010; ICAS, 2002).

OPPORTUNITIES FOR PERSONALIZATION?

Perhaps, but innovation is needed. Students need and deserve lots of explicit writing instruction. Then, tech-enabled instruction can be a slice of students' instruction, thereby providing students with needed targeted practice on what the class is doing.

The teacher needs to conduct explicit, whole-class instruction, although tech-enabled programs could provide students with practice transferring and assimilating evidence into compositions. Again, AES platforms could work in tandem with teacher writing assignments, so compositions' scoring does not fall completely on the teacher.

4. PROVIDE PRACTICE ON HOW TO MINE SOURCES—TO EQUIP STUDENTS WITH THE SKILLS AND KNOW-HOW TO VALUE EVIDENCE.

Several recent studies show that student writing suffers from a shallow grasp of what constitutes evidence in sources and how to use it (Horning & Kraemer, 2013; Howard, Serviss & Rodrigue, 2010). A particularly illuminating investigation by Jamieson and Howard (2013) revealed that even with the recent emphasis on writing with evidence, an overwhelming number of students (94 percent) merely "mine sources" for sentences, which they then only superficially integrate into their writing (p. 117). The result is a kind of "patchwriting"—a sea of floating quotations not smoothly fitted together into coherent and flowing prose (Howard, Serviss & Rodrigue, 2010, p. 178). Jamieson and Howard (2013) were even blunter, describing it as a form of copying rather than composing. They observed that many students do not know how to use the evidence they discover to craft their arguments effectively.

OPPORTUNITIES FOR PERSONALIZATION?

Perhaps. Like #3 above, students need and deserve lots of explicit instruction in learning how to mine sources to accelerate their literacy outcomes. Tech-enabled instruction can be a slice of students' writing instruction and assist students with targeted practice on what the class is doing.

There are tech-enabled programs out there that allow students to "highlight the section of the text that offers evidence for the claim." Additional future innovations could advance students' targeted practice on mining sources.

WHAT HAPPENS NEXT?

Once you have identified that you want to pursue a personalized approach and you have determined that it is tangibly tied to one or more of the literacy accelerators, ask yourself whether it:

1. **Advances the right content for your students?**
2. **Promotes equity and counteracts bias in both the assignment and delivery of the chosen instruction?**
3. **Offers opportunities to elevate student interest or agency in their own learning?**
4. **Is easy to use and implement?**

(See the Consideration Questions (Appendix A) for more detailed reflections.)

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Reading Comprehension... The Rest of The Story

VIEW RECOMMENDATIONS

OVERVIEW

Comprehension is a term we all use all the time. But it can be misleading since *everything else in reading lies underneath and contributes to reading comprehension*. If a student has weak word recognition, which, as you know by now, means too small a sight-word vocabulary, she can't be fluent (Accelerator #1). In that case, she will undoubtedly struggle with comprehension. If she is fluent and has a good-sized sight vocabulary but knows the meaning of too few words (Accelerator #3) and has limited prior knowledge (Accelerator #2) for what she's encountering, she will continue to struggle with comprehension. If she cannot marshal textual evidence in the service of a skilled interpretation of what a text says directly or inferentially (Accelerator #4), then again, her depth of comprehension will be compromised. A costly and widespread failure of much reading instruction has been the failure to realize that inferencing during reading does not exist in a vacuum. Ever. Inferencing is embedded in a nest of other capacities, already explored in the other syntheses in this series.

But if all of these ingredients are in place, is there anything else? The efforts made to answer this question have spanned decades. Forests have been felled in this quest. A search on Google Scholar for "comprehension skills" yields nearly two and a half million hits in a fraction of a second. We'll shortcut that for you in these several pages and bring the best current thinking to bear. Bottom line, reading comprehension is not a thing; it is not a cluster of observable skills. It exists in the reader's mind. Scientists refer to this existence of comprehension in our mind as "representation."

Even when the other four literacy accelerators are in place, comprehension still requires readers to develop a mental representation of the text. Turns out, this representation in our minds exists at three levels—surface level, text-base level, and the situation model—all of which are needed to comprehend a text truly (Kintsch, 1998). All three develop *simultaneously* as students read the text.

> Bottom line, reading comprehension is not a thing; it is not a cluster of observable skills. It exists in the reader's mind. Scientists refer to this existence of comprehension in our mind as "representation."

Generating these levels of understanding draws on students' ability to bridge inferences both among idea units within the text and between the text and the reader's knowledge. Doing this well also depends on cultivating

in students a habit of mind that drives them to make sense of what the author is saying. Designing instruction that focuses on both these elements can turn good readers into great readers.

HOW EXACTLY DOES THE READER'S ABILITY TO REPRESENT TEXTS PROMOTE COMPREHENSION?

Again, there are three levels of text representation: surface-level, text-base level, and situation model.

A **surface-level** understanding allows readers to recognize the text's words and read them fluently even if they do not understand their meaning. We can think of this as essentially decoding or word recognition. In the sentence "The lome saths grib," we can pronounce the words and read the sentence fluently, but it has no meaning, so it exists in the mind *only* at the surface level. In other words, what is in mind is the visual representation of the words and the sound or auditory representation of the words. You may have experienced this for yourself singing or reciting something from a language you don't know.

The next level is **the text base**. Renowned cognitive scientist Walter Kintsch split the text base into two parts: the "macrostructure" and the "microstructure" of the text (1998). The *macrostructure* is the overall structure of a text—how the author organizes the text. The macrostructure for narratives includes setting, protagonists, what the characters intend to do, and the outcome (what happened, whether intended or not). The macrostructure for nonnarrative texts can have various structures: problem/solution, goal/action/outcome, chronological, descriptive, generalization, and examples or any combination across a given text. Understanding the macrostructure helps a reader determine the most important ideas and the author's purpose. Teaching students to attend to and recognize macrostructure supports comprehension even in very young students (Williams et al., 2016).

Cognitive scientists define the *microstructure* as the "propositions." Propositions are individual idea units in the text. Here's an example from Kintsch (2019):

> *The hiker watches the elk through his binoculars.* We have a subject (the hiker), an action (watches), an object (the elk), and in this case, an instrument (his binoculars). The proposition is an idea unit, and the idea unit is stable even if the syntax changes. *For example, here are two:*
>
> *Through his binoculars, the hiker watches the elk.*
>
> *Watching the elk through his binoculars was a hiker.*
>
> These all present the same proposition or idea unit even though they are different sentences—some clunky!

Connections between propositions can be explicit, with the author signaling the reader how one proposition connects to another, or more inferential, leaving it to the reader to figure out (infer) the connections. The ability to make these inferences while reading is a skill. Numerous studies (Soto, et al., 2019; Kendeou, et al., 2016; Kintsch, 2019; Cain et al., 2001) have shown that students who make these inferences are more proficient readers. That's good news, because skills can be practiced—in this case by being encouraged and shown how to make inferences in context while reading.

The **situation model** goes a step beyond to connect the text base's representation in the reader's mind to the reader's existing knowledge base. In other words, proficient readers fully understand the text base and enrich that understanding with their existing knowledge[1] , thus forming a complete picture of the text. Importantly this knowledge does not replace the text but rather adds nuance, richness, and context. In a sense, it elaborates on the text-base model. Through the situation model, the reader transfers her thinking from short- to long-term memory. This deeper, fuller understanding of what was read is then integrated into a student's ever-evolving knowledge base. It is how the mind ultimately represents the text in all its fullness. The

[1] Knowledge, background knowledge, and prior knowledge are often used interchangeably. Background knowledge, though, implies what you know from your lived experience. In contrast, prior knowledge and knowledge are more broadly conceived to include lived experience and what is learned from reading or other sources, organized learning, or a combination.

situational model—not the surface level or text base—is what readers use when recalling the text in the future. The situation model develops and is adjusted in real-time as the reader progresses through the text.

It is important to note that all three mental models are in play when a reader is actively reading. Here is another example with all three models in play:

> Consider two proficient middle-school students reading a passage on hibernation. Both could read the words (*surface level*). Both could develop a text base level of the microstructure connecting the relevant propositions (e.g., how hibernation slows down metabolism, its adaptive advantages, dangers from predators while hibernating). Both could develop a text base incorporating the text's structure (concept, examples). But the student who had previously read several texts about bears or was familiar with animals that hibernate from reading or watching nature shows could develop a yet richer sense of hibernation. His knowledge elaborates on the text base without invalidating it. Researchers sometimes refer to inferences that connect to knowledge as "elaborative" inferences. Not all knowledge enhances the situational model, however! If another student connected the text on hibernation to his grandfather's naps, he would not have understood the essence of hibernation. Elaborative inferences only enhance the situation model when they are relevant to the text base—and when knowledge is accurate.

We are talking here about initial reads and rereads, which should always be for students to develop or begin to develop depending on the difficulty of the text a situation model of the information texts are transmitting. There could, of course, be times that teachers ask students to go back to a text for a specific purpose (e.g., explain how a character has changed, identify the main idea) for either a discussion or when being assessed. *But when that one-skill-at-a time instructional method reigns supreme, students' focus will become too narrow to develop a full model of the text.*

It gets little to no attention, sadly, given its instructional implications, but the reading research tells us that texts reflecting a mix of both a students' lived and unlived experiences best support growth in comprehension and building a situation model. Here's why:

- When students read texts *more* reflective of their lived experience, the bridging inferences needed to tie together the text base both between propositions and to the readers' knowledge are more likely to be automatic and more likely to yield a richer, more nuanced situation model. Those texts are easier to read for that student but important in honoring and affirming their experiences and possibly deepening their knowledge base. This has obvious implications for equitable representation of student identities through text selection.
- When students read texts *less* reflective of their lived experiences, they get to exercise the muscles needed to make the more effortful bridging inferences between propositions and to their knowledge. The reading may feel more challenging, but their inferencing muscles have grown more robust in the process. This has obvious implications for varying both topics and text selections so every student has broad exposure to alternative perspectives and unfamiliar topics.

> It gets little to no attention, sadly, given its instructional implications, but the reading research tells us that texts reflecting a mix of both a students' lived and unlived experiences best support growth in comprehension and building a situation model.

HOW DOES A READER'S ABILITY TO MAKE BRIDGING INFERENCES STRENGTHEN READING COMPREHENSION?

Oudega and Van den Brock (2018) note that "readers' ability to generate inferences during reading, from background knowledge or information read earlier in the text, is one of the strongest predictors of reading comprehension development." Numerous additional studies (Soto et al., 2019; Kendeou et al., 2016; Kintsch, 2019; Oakhill & Cain, 2012; Kendeou, Bohn-Gettler, White, & van den Broek, 2008; Cain et al., 2001) back up this finding.

Which students effectively make these inferences as they move through a text? And what determines why some do, and others don't or why some do more so than others? Of course, students can't make an inference with knowledge they don't have. And as noted above, you can't glean information about what kind of connection to make if you don't know the meaning of the connecting word or other words relevant to making the inference. On the other hand, having knowledge does not *necessarily* mean students will make the bridging inferences.

Cain et al. (2001), set out to answer these questions in an ingenious experiment. They used two groups of students. They matched each group in decoding, word recognition, and fluency, but one group had strong comprehension, the other weaker comprehension. The research team created an imaginary planet. Both groups had lessons and stories about the fictional planet until, based on assessments of what they had learned, their knowledge of the planet, *including what they remembered*, was equal. Cain et al. found that "less skilled comprehenders' difficulties with inference making were not wholly accounted for by memory for the text or information outside of the text that was essential for inference generation. An analysis of errors revealed that a more likely source of inference-making difficulty for this group was an inability to select the information relevant to making the inference." In other words, "less skilled comprehenders" failed to make necessary inferences or connections to their knowledge of the imaginary planet even though it was clear, based on assessments, that they had that knowledge and their memory of the text was a good as the high comprehension students. They also failed to make inferences among the text's propositions even though their memory of the text was as good as the more skilled comprehenders. Cain et al. attributed this to the idea that "the less skilled comprehenders experienced difficulty in selecting the relevant information on which the inference should be based." Another study, Todaro et al. (2010), had similar findings, noting that "less skilled readers are not as adept at suppressing irrelevant information…"

In other words, these less skilled readers' problems could be twofold. They aren't making necessary inferences because they are unable to:

1. Connect to the knowledge they have about the topic;

2. Suppress irrelevant information or select relevant ideas on which the inferences should be based.

Cain controlled for both the students' memory of the text needed to make inferences between propositions and the knowledge base needed to make inferences to prior knowledge. In our current planet however, a student cannot make these inferences if the vocabulary and knowledge demands are too great for her stores of word and world knowledge to meet (Accelerators #2 and #3). Nor can a student make reading inferences if the words on the page cannot be automatically and fluently processed (Accelerator #1). Thus, growing those stores and building those foundational aspects of reading need to be an essential part of reading instruction *and must be considered first whenever comprehension breaks down.*

Models of reading comprehension clearly show that successful comprehension requires students to use inferences to integrate the text's propositions with their knowledge. In some cases, students can integrate automatically; in others, the task requires more effort (Van den Broek & Helder, 2017). Inferencing skills can be developed and practiced—in this case, by being encouraged and shown how to make inferences in context

while reading with supports from the teacher. Students need to learn to use bits of information when they appear. We also know that when students possess a strong standard of coherence, as discussed in the next section, the integration process is more likely to succeed (Oudega & van den Broek, 2018).

HOW DOES A READER'S DRIVE TO MAKE MEANING STRENGTHEN READING COMPREHENSION?

Strong readers possess a drive to make meaning. Researchers have tagged it as readers possessing a standard of coherence when they read. Standard of coherence is the reader's expectation to comprehend what the author has put before them, and how much they are willing to work for that understanding (Oudega & van den Broek, 2018). When students develop this habit of mind, they expect to get a fuller understanding of what they read than students who haven't yet grasped this conviction. Graesser, Singer, and Trabasso (1994) note that when students' standard of coherence is high, those readers are more likely to use strategic reading in search of the coherence they expect to find.

Students with a higher standard of coherence are more likely to notice if they fail to make a needed inference and more likely to stop and repair whatever is interfering with that understanding. Conversely, Ferreira, Bailey, and Ferraro (2002) note that when readers' standard of coherence is low, they are more likely to be satisfied with a surface "good enough" sense of what they read. When readers have higher standards of coherence, they spend more time, make more connecting inferences, and build more robust mental models of the text (Narvaez, van den Broek, & Ruiz, 1999; van den Broek, Lorch, Linderholm, & Gustafson, 2001; Yeari, van den Broek, & Oudega, 2015). Although this body of research shows that different tasks set before readers will induce different standards of coherence, it also shows that students with higher standards of coherence bring their determination to uncover meaning to any task (Oudega & van den Brock, 2018).

Why do some students have higher standards of coherence than others?

Personality and natural tenacity are likely one answer; however, many young people who are plenty tenacious in some aspects of their lives are quick to abandon efforts to make sense of complex readings when the going gets tough. Most students in our country learn to read and grow as readers during school. Thus, this disposition is most likely an outgrowth of instruction, adults providing encouragement, and what students learn in school. They develop beliefs about themselves as readers who can understand what they read if they work at it (or not). Students can be taught to pay attention to whether they understand and then do something about it when they do not. They can learn these habits through peer and teacher modeling, through lots of chances to process in company, and by teachers encouraging and expecting this stick-with-it-ness from all their students.

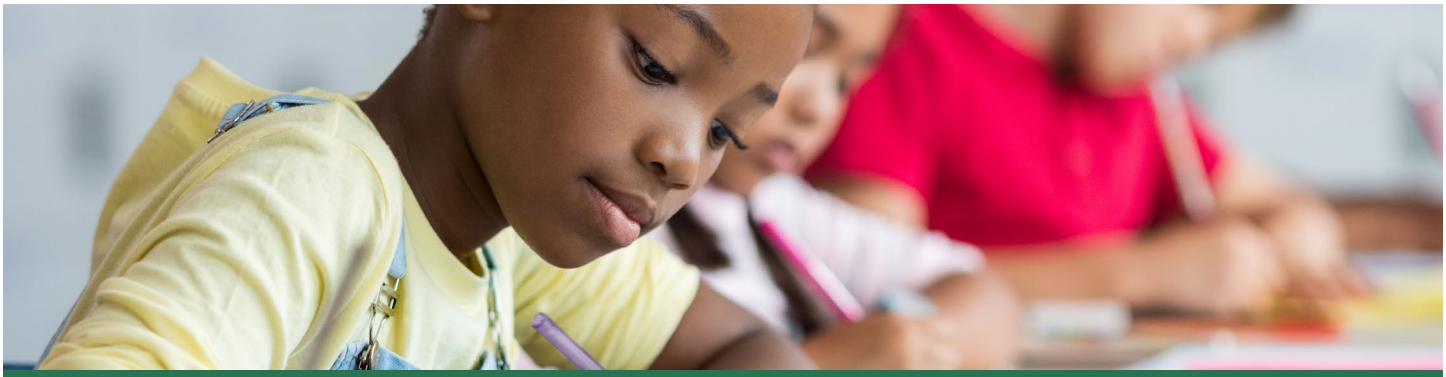
An essential part of developing a healthy standard of coherence is for teachers to present students with texts that challenge them. They must also present students with tasks that accompany those texts that give them

a chance to initiate a response on their own or with peers and then refine or affirm that response with teacher feedback (Oudega & van den Brock, 2018). All students must be encouraged to stick with challenging reading and given the tools they need to be successful in all aspects of it.

Comprehension starts to break down or become corrupted when an individual proposition is not understood. That proposition is then either not integrated into the text base or integrated in such a (faulty) way that the reader's text base no longer reflects what the author wrote. The same is true with failures to make necessary bridging inferences between propositions and to prior knowledge.

> Students can be taught to pay attention to whether they understand and then do something about it when they do not.

Here again, a reader with a strong standard of coherence is more likely to recognize the breakdown, stop, and go back to make the comprehension repair. Otherwise, the mini-confusions stack up into too formidable an obstacle. When the reader does not have the requisite knowledge to make the necessary inferences, she may be able to use the knowledge she does have. If that is not possible there will inevitably be a breakdown in comprehension. This is why knowledge is so important. But even here a high standard of coherence would make the reader aware of the breakdown and possibly aware of the knowledge she is missing. In the age of Google, this breakdown might be easily patched thus helping to put a student with less knowledge on a more equal plane. Nonetheless, the more knowledge, the better.



Recommendations

How can instruction teach students to deeply comprehend texts? Below are ways for students to build their muscles to generate relevant bridging inferences and cultivate a habit of mind that drives students toward making sense of the text.

The lead approach—stated first—is the most productive and it is not conducive to personalization:

1. EMPHASIZE THE CAREFUL, FOCUSED, COMMUNAL READING OF RICH, COMPLEX TEXTS.

It is impossible to teach students to become great "inferencers" or readers with strong standards of coherence—with very simple texts. It is dreary and unproductive to do with unworthy text. Traditional leveled text programs that limit student reading exclusively to their designated independent or instructional reading level—too often simple, below-level texts—are disastrous for children and contrary

to this research. There is another important implication for how reading instruction should not be approached. Once students know how to decode, if instruction directs students to address specific strategies or standards, developing a standard of coherence becomes nigh impossible. Reading for a single purpose rather than understanding and gleaning information from text is a disjointed, *incoherent* approach, the opposite of what driving for coherence demands. And there is no evidence that limiting students in this way enhances performance as Tim Shanahan has documented repeatedly in his blog posts.

Nevertheless, this kind of one-thing-at-a-time instruction runs rampant in reading comprehension instruction. As explained throughout this discussion, models of comprehension and all the research show that proficient reading requires *integrating and updating* propositions from across the text into the readers' text base and situation model. In other words, readers are continually processing lots of elements of the text to understand the whole fully. If a reader were only reading to determine the relationship between two characters, their focus would be too narrow to develop a model of the text. It would not promote the expectation in students that they *should* develop a full model of the text. Teaching like that does not promote understanding, nor does it build the kind of tenacious drive toward complete understanding that successful readers demonstrate.

Learning how to comprehend text deeply is done via regular doses of communal close reading of complex texts—a mix of texts that are both mirrors and windows to students' identities. Close reading can focus on the text's ideas, their relationship to each other, and the text's central ideas. Asking students to make the inferences necessary to understand and then contrast their thinking with their classmates or their teacher's responses maximizes comprehension (Oudega & van den Broek, 2018) since students can learn from one another and not rely solely on the teacher's interpretations and modeling. This practice can and should be built into close reading instruction as a main ingredient, not a side dish. Teachers can coach students to pay attention to whether they understand and then ask them to do something about it when they do not. All students must be encouraged to stick with reading and given the tools they need to be successful in all aspects of it.

OPPORTUNITIES FOR PERSONALIZATION?

Not generally recommended when text complexity is high. Classrooms are centers of cultural exchange and co-learning. Making sense of rich, complex text must frequently be a social endeavor; not one learned predominantly in isolation where students are left to their own devices. Students can best learn stick-to-it-ness as a habit of mind through peer and teacher modeling in the context of close reading. In a social context, teachers can insist and expect this mindset from all their students. In this context, students could learn to expect the text to make sense and learn how to make the text make sense. Whether tech-enabled tools could ever entice this kind of hard cognitive work better than peers and teacher coaching is doubtful, and at the very least, far off into the future.

Following are some additional methods to boost the comprehension accelerator that are more conducive to personalization[3]:

2. FOCUS STUDENTS' ATTENTION ON TEXT COHESION AND PROPOSITION CONNECTIONS:

While a focus on proposition connections are fodder for good close reading of complex text, there are obvious implications for the power of directly teaching (and practicing) how text connectives work to

[2] Shanahan on Literacy Blog posts: 8.21.11, 2.7.17, 5.14.17, 1.11.20

[3] Note: These personalization ideas originate from the literacy research and their promise comes from how closely they hew to that research. There is not yet a separate personalization research base to support them, nor have they been brought into scalable form for classroom use.

assist understanding. Any student who may not have much experience with connective words, especially the fancier versions within each category, e.g., students who know *but* may not know *to the contrary*, will benefit. They need to understand the role these words play in carrying meaning. Connections can be explicit or they might be subtle. The author can signal to the reader how one idea in a text connects to another or be more inferential, leaving it to the reader to figure out (infer) the connections. The ease or difficulty of connecting propositions or ideas units inside the texts depends on several text features psychologists refer to collectively as cohesion. These are the features of the text that help tie it together. In terms of comprehension models, cohesion elements are the text features that make it easier to connect the network of propositions in the text base. There are two kinds of cohesion: referential and global.

- Referential or local cohesion: Referential cohesion is the repetition or overlap of words, phrases, or clauses from sentence to sentence. They can be sentences that are adjacent or farther away. The closer the sentences are that reference each other, the easier the text is to read.

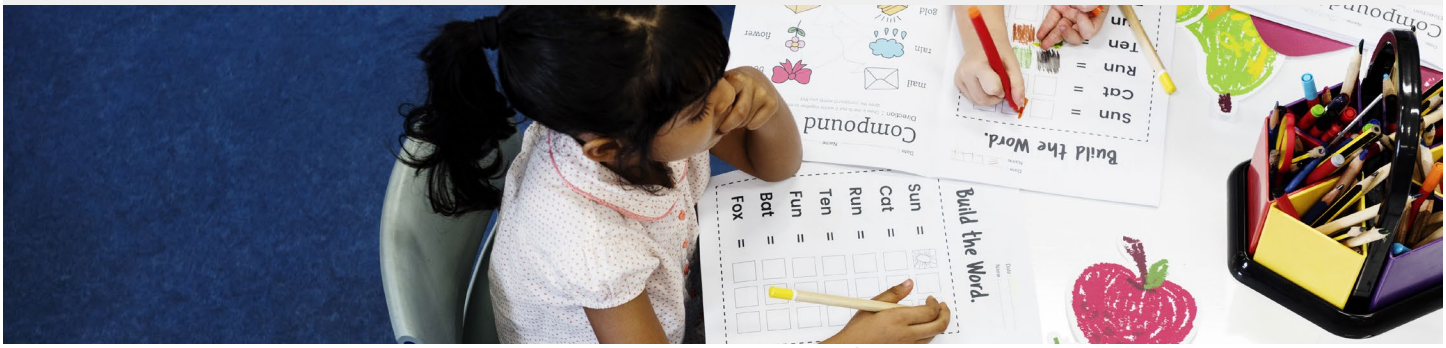
- Global cohesion: Global cohesion is the language used to help readers tie together propositions throughout the text. As noted earlier, these text features are called connectives, and researchers have identified various types. Causal connectives are terms such as: *because*, *consequently*, *as a result*, *thus*. There are also temporal connectives (*later, afterward, earlier, during*); sequential connectives (*first, second, next, last, "from here on"*); additive connectives (*additionally, furthermore, moreover, both, what's more*); adversative connectives (*but, however, yet, although, nevertheless*). Connectives can also signal central ideas (e.g., "Despite these setbacks, their success was enormous").

A failure to attend to connectives can cause catastrophic failures in students' integrating propositions within the text base. They are the fodder of good close reading since every student deserves to be initiated into their importance. English learners have particular need to have connectives and their function in context explicitly pointed out to them by peers or teachers whenever text is being discussed.

OPPORTUNITIES FOR PERSONALIZATION?

Yes! Following close reading lessons, personalized and targeted practice with the meaning and import of referential and global text connections would advance students' abilities to make sense of text.

Looking for local or global cohesion can benefit from targeted teaching and practice—human or tech-enabled. One can imagine paper-based exercises and computer programs that supply this practice in lively ways. Experimental intelligent tutoring systems such as those designed by Danielle McNamara like SERT (self-explanation and reading strategy training), and iSTART (Interactive Strategy Training for Active Reading and Thinking), and others prompt and respond to student explanations of what they are reading. When the descriptions indicate students have missed a connective, these programs can point the student in that direction. McNamara's work with iSTART and SERT has shown promise through tech-enabled programs in encouraging the sort of self-explanations that lead to the development of a more robust and accurate text base and situation model. These intelligent tutoring systems can be used with any text and can support reading core texts or supplementary texts connected to topics being studied.



3. CONNECTED TO #2 ABOVE, TEACH STUDENTS TO DISTINGUISH BETWEEN RELEVANT INFORMATION NEEDED TO CONNECT A GIVEN TEXT PROPOSITION AND DETAILS THAT ARE EXTRANEOUS

Students benefit from teacher and peer support here; they benefit from whole class or small group work. With expert instructions, students can learn from one another about what to pay attention to and what to set-aside as they explore rich, compelling, complex texts.

OPPORTUNITIES FOR PERSONALIZATION?

Perhaps. Students need and deserve lots of explicit instruction in this area to accelerate literacy. Tech-enabled instruction is just beginning to emerge from experimental studies that can be a slice of students' instruction and provide them with targeted practice on what the class is doing.

Imagine programs that regularly follow up to provide students with practice inference-making in the context of these texts. They learn with feedback when selecting relevant information from less relevant and how it connects propositions in the text necessary for comprehension. Further, it could alert students as to how and why they may have gone astray in this process. As noted above, some ITS programs show promise (SERT and iSTART) in helping students see when they did not make the needed connections.

WHAT HAPPENS NEXT?

Once you have identified that you want to pursue a personalized approach and you have determined that it is tangibly tied to one or more of the literacy accelerators, ask yourself whether it:

1. **Advances the right content for your students?**
2. **Promotes equity and counteracts bias in both the assignment and delivery of the chosen instruction?**
3. **Offers opportunities to elevate student interest or agency in their own learning?**
4. **Is easy to use and implement?**

(See the Consideration Questions (Appendix A) for more detailed reflections.)

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APPENDIX A | **CONSIDERATION QUESTIONS**

(This is a standalone resource drawn from the Operating Principles in Section 3)

This resource is designed first and foremost for educators, whether district-based or school-based. Though many of these decisions are not in the hands of teachers, these considerations may provide a useful frame for teachers as well.

Another audience that should tap into these consideration questions are product designers and those who invest in product and instructional materials development. Though educator-facing, this set of considerations is also intended to help designers focus on the crucial research base for what accelerates literacy growth in an equitable way as they think about creating personalized tools and approaches for student and teacher use.

This series of questions is designed to support you as you work to strengthen your students' literacy capacities in an equitable, research-grounded way. Before you adopt any new approach or program to support strengthening the five literacy accelerators in your setting, we recommend you follow these three steps:

STEP 1

Assess your students' current literacy needs and strengths vis-a-vis grade-level work: What gaps in instruction are you trying to close by adopting or using a personalized product or approach?

- **What is your shared view on how the current core ELA program (and daily schedule) is meeting the learning needs of students?**
- **What are the current literacy capabilities of your students?**
  - On which accelerators are they performing well?
  - What do you want to strengthen? (Remember the accelerators lean on one other. In other words, strengthening one often strengthens others. But don't make the mistake of concentrating on one to the exclusion of others!)
- **Are you collecting quantitative and qualitative student data?**
  - Are there any disparities in student data at the whole school or sub-group level, paying particular attention to students who have frequently been marginalized and chronically underserved such as Black students, students experiencing economic insecurity, and English learners?

[Use this space to answer the questions.]

STEP 2

What are the best ways to strengthen the core ELA instructional program so students' needs are better met?

Once you've taken a hard and honest look at your students' progress, it's time to decide if you need to improve the implementation of your current ELA program, adjust or modify the current ELA program, supplement your ELA program with additional products or approaches, or adopt a new core ELA program that will do a better job with the literacy accelerators.

- **Improve implementation of your core ELA program:**
  - Does your current core ELA program address all five literacy accelerators?
  - Are all current critical core ELA program elements being implemented with fidelity?
  - Can school leaders and teachers articulate, in detail, the instructional vision?
  - Could better implementation or prioritization better meet the student needs identified in Step 1?
- **Eliminate from instruction what isn't serving students:**
  - Are there core ELA program initiatives that are not aligned and not mission critical? They need to go to focus time and energy on what matters most.
- **Adjust the current core ELA program:**
  - In what ways is the core ELA program not doing the job?
  - Do the approaches to the literacy accelerators in the core ELA program reflect the research contained in this report (in sections 4–8)?
  - Could it meet your (and students') needs through strategic adjustments or modifications?
- **Find a new core ELA program:**[1]
  - Have you engaged stakeholder groups for equitable representation for materials selection?
  - Has the group tasked with adoption been trained in the literacy accelerators and their implications for what should be in core materials?
  - Do you have an easy-to-use checklist or rubric for comparing different programs consistently?
  - Have you asked all publishers you are considering to provide evidence for the research base of their program?
  - Does it match what you know of the literacy accelerators?
  - Are the materials—particularly the text selections—representative of different groups, including students who have frequently been marginalized and chronically underserved such as Black students, students experiencing economic insecurity, and English learners?
- **Supplement your current core ELA program via personalization tools or approaches: If you've replaced, improved, or adjusted your core program, then it's time to consider personalization to enhance outcomes across the literacy accelerators.**
  - How does the proposed personalized product or approach address the identified need(s) not yet met (note: we strongly caution educators not to rush immediately to add a new supplemental product or tool as a solution)?

[Use this space to answer the questions.]

[1] See additional questions in Step 3 to utilize for core program selection.

STEP 3

Evaluate potential personalized products or approaches.

As you evaluate new or existing programs, use these questions to consider whether or not the product or approach is consistent with the Operating Principles for accelerating literacy outcomes.

- **Does the product or approach advance the right content?**
  - Does this product or approach address the specific program gap(s) or literacy needs you identified in Step 1? Which specific literacy accelerator(s) does the product target?
  - Does the product or approach address these needs in ways that are consistent with the research?
  - Is the product or approach consistent with your vision and instructional approach to literacy? How is this approach intimately tied to what students are learning in class?

- **Does the product or approach promote equity and counteract bias?**[2]
  - Do the personalization strategies equitably provide improvement in the literacy accelerator(s) being targeted?
  - Is there disaggregated data demonstrating this?
  - Does the product or approach track students by current skill level or require that teachers track students? On what basis are students assigned to personalized work?
  - How do students move between skill-based groups?
  - Does the product or approach support all students to access grade-level work in literacy? If not readily apparent, ask for specific detail about how it does that.
  - Are there claims and evidence to support students for skill gains over a school year? Are these gains disaggregated in any way for different student populations? Ask for them if they are not provided.
  - Can students articulate what it takes to move up or why they are being assigned or grouped as they are?
  - Does the product or approach affirm multiple identities?
  - Does the product or approach represent the lives and identities of diverse students without relying on cultural stereotypes?
  - Were the products or approaches designed with equity right from the beginning and throughout the iterative process?
  - Does the product or approach prioritize understanding the knowledge, experiences and other assets that diverse students bring to the learning process?
  - Could you visit/observe this product or approach in action with students who reflect your own students' identities?

[2] Several of these questions are inspired by the EF+Math, Developing Education Products with Equity at the Center framework (Angevine et al., 2019). We recommend that product designers and product consumers read the entire piece for a fulsome understanding of equity considerations.

- **How will students experience this approach or product?** (Does the product promote student agency and interest?)
  - Is there evidence that students are engaged by and satisfied with their experience with this product or approach?
  - Is there evidence that the product or approach motivates students who have been historically marginalized?
  - Will students see a clear link between their whole class work and their individualized experiences?
  - Did the team who conceived of the product or approach include students?
  - Were students engaged meaningfully and brought fully into the design and development process?
  - Does using this approach or product increase student agency and sense of control over their learning?
    - How do you know?
    - Will this product or approach help students respond with a stronger yes to these statements[3]?
      - I belong to this academic community.
      - I believe I can succeed.
      - My ability grows with the effort I put in.
      - This work has value.
- **Is this approach or product easy enough to use that we can build and sustain the change?**
  - What things are you going to stop doing so there is time to include the personalized approach?
  - What training and support will teachers need to make the planning and instructional shifts necessary to support use of this product or approach?
  - Can teachers reasonably implement the program given their other responsibilities and district priorities?
  - If something you introduce is potentially more complex (for example, a concerted effort to provide culturally relevant content and approaches into student experience), have you done the change management work you need to so teachers embrace the change?

[Use this space to answer the questions above.]

REFERENCES

Angevine, C., Cator, K., Liberman, B., Smith, K., Young, V. (2019). *Designing a Process for Inclusive Innovation: A Radical Commitment to Equity.* Digital Promise.

Farrington, C.A., Roderick, M., Allensworth, E., Nagaoka, J., Keyes, T.S., Johnson, D.W., & Beechum, N.O. (2012). *Teaching Adolescents to Become Learners. The Role of Noncognitive Factors in Shaping School Performance: A Critical Literature Review.* Chicago: University of Chicago Consortium on Chicago School Research.

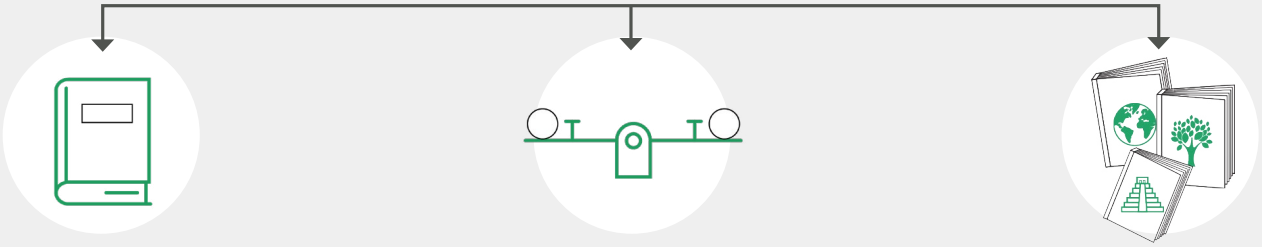
[3] Grateful to the work of the Chicago Consortium for articulating these four questions (Farrington et al., 2012).

APPENDIX B | IMPLEMENTATION GUIDANCE FOR LITERACY ACCELERATION[1]

In order to implement the recommendations in this report, many schools will need to make shifts. Schools, teachers, and students are all in different places. This is always the case, but is currently exacerbated by nearly a year of education during a pandemic. So these recommendations are framed to answer this question: "As a district/school/teacher, what can I do short term and what can I do longer term to accelerate literacy outcomes for my students—with the aid of personalization where appropriate?".

There are three scenarios in the charts[2] below to play out these recommendations. They are based on what kind of ELA approach is currently in place:

What is your current approach to teaching literacy?



Comprehensive ELA program (a basal) forms the basis of ELA teaching and learning

A balanced literacy approach forms the basis of ELA teaching and learning (with or without a formal program like Units of Study).

A research-based, knowledge-rich curriculum forms the basis of ELA teaching and learning, one that incorporates the literacy accelerators.

As we have noted at various points in this paper, the most effective change is to have a research-based ELA program that includes each accelerator. That same recommendation is a recurring theme of this resource: as soon as possible, ensure a research-based ELA program (or programs) is selected and in place. See the Consideration Questions (Appendix A) for specific recommendations for doing so.

1. **Deploy a systematic, structured foundational skills program;**
2. **Deploy a knowledge-rich ELA curriculum (note—there are programs that do both 1 & 2);**
3. **Build teacher capacity in the accelerators through content-aligned, job-embedded professional learning cycles.**

Then, enhance personalization following the recommended priority areas from the report. Select specific personalized approaches or tools to ensure "every student gets what they need and everybody gets the good stuff" in order to accelerate student literacy attainment toward or beyond grade-level expectations.

Throughout the chart, symbols mark the recommended approaches:

- Human-enabled
- Technology-enabled
- Tech-enabled not recommended

[1] While it is beyond the scope of this paper to articulate a full vision of what an ELA classroom would look like (with all the literacy accelerators in place, personalized approaches integrated into the classroom so student needs are met, equitable learning outcomes prevail, and every student thrives), that vision has been developed in other resources. See Placing Text at the Center of a Standards-Aligned Classroom, Both/And Literacy Instruction (for K–5), or Recommendations from The Opportunity Myth (especially for older students).

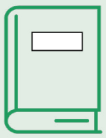
[2] Foundational skills (Accelerator #1) is in a chart apart from the other 4 accelerators since effective approaches differ substantially.

Literacy Accelerator 1

Foundational Skills & Automatic Word Recognition: Phonemic Awareness, Phonics, Fluency

SCHOOL STARTING OUT

We use a basal reading program with lots of components. Foundational skills is one of them. It is structured but can get lost in the shuffle of the many demands.



SHORT TERM STEPS...

INVENTORY THE COMPONENTS:

Does it assess foundational skills at least weekly with actionable follow-up depending on student mastery of discrete skills?

If not, request guidance and recommendations from the materials maker. Most basal programs do have regular assessment of foundational skills, but if omitted, ask them how this was omitted.

Does it have an abundance of practice opportunities for phonics mastery for the majority of students who need a lot of reps, including activities students can do independently?

If not, integrate resources to quickly add additional at-bats and student practice, which can be tech-based or human enabled tasks.

Does it have both basic and advanced phonemic awareness (most programs do not have the latter, as of 2020)?

If not, consider using a stand-alone phonemic awareness program. A free easy-to-use and lively program can be found here.

Does it teach and support the discredited three-cueing system for word recognition?

If it does, provide professional learning addressing why this is ineffective and how to replace it with a phonics-first approach

In the meantime, you can use the easy-to-follow tool *(found at the bottom of the webpage) for reinforcing phonics patterns even with non-decodable books.*

Does it use a centers approach?

If it does, is it clear that the activity in the center maximally and directly reinforces elements of foundational skill instruction (for example matching correct spelling to pictures instead

LONG TERM STEPS...

AS REGULAR BEST PRACTICE:

After a skill is introduced and students have had a chance to practice it, students are assessed on that skill. How students do on each assessment drives next steps for personalized student work and follow-up using differentiated instruction.

Phonemic Awareness/Advanced Phonemic Awareness:

Students who demonstrate mastery of current and past skills:

- Play oral sound games like building silly sentences with same first sound words or of onomatopoeia words (with peers or tech-enabled).
- Listen to recorded books while following along.

Students who are not yet demonstrating mastery of current and past skills:

Focused practice on challenge spots doing various phonemic manipulation activities (to build speed and accuracy until mastery is reached).

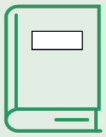
Phonics:

Students who demonstrate mastery of new and previously introduced patterns:

- Read independently or with peers.
- Free-write using known patterns correctly, inventing spelling to approximate patterns not-yet-learned.
- Play word games via computer, paper & pencil, or socially

Students who are not yet demonstrating mastery of new and previously introduced patterns:

- 1:1 tutoring
- more opportunities for practice, in and out of context

SCHOOL STARTING OUT	SHORT TERM STEPS...	LONG TERM STEPS...
We use a basal reading program with lots of components. Foundational skills is one of them. It is structured but can get lost in the shuffle of the many demands. [*continued*] 	*of spending time drawing pictures illustrating a phonics pattern; phonics sorting activities that include saying the word and analyzing the sounds each letter or letters represent rather than just compiling lists. See the* Both/And Literacy Instruction (Appendix) *for practical guidance.* **GENERAL ACTIONS TO IMPROVE STUDENT OUTCOMES:** • **At the school level, make clear the priority place foundational skills have in the early grades (Pre-K or K–3).** • **Prioritize foundational skills instruction in the early grades by ensuring teachers are able to dedicate at least 45 to 60 minutes daily.** • **Ensure all staff understand the crucial role regular diagnostic assessments play in student success with foundational skills mastery.** • **Ensure staff know how to effectively use the diagnostics and information from assessments to personalize instruction and student learning.** • **Provide professional learning on the research base for the components of foundational reading if teachers do not know it. Include support personnel in this work.** • **Provide teachers with content-specific professional learning or coaching so every teacher can navigate the foundational skills resources of the program confidently. Include support personnel in this work.**	**Fluency:**  *Students who demonstrate mastery of grade-level text:* · Do Readers Theater or other fun activities that promote confident public speaking. · Prepare for formal public speaking (of practiced passages). · Read independently or with peers. · Free-write. · Do buddy reading that supports other students not yet fluent.  *Students who are not yet demonstrating mastery of grade level text:* · Engage in small-group or tech-enabled work that provides more reps with fluency while reading (programs like Amira or Read Naturally can be effective, but require human cheerleading!). · Do Readers Theater or other fun fluency activities that also promote confident public speaking. · Prepare for formal public speaking (of practiced passages).

SCHOOL STARTING OUT	SHORT TERM STEPS...	LONG TERM STEPS...
Foundational skills are integrated into our balanced literacy program and are mostly done in context. We do not have a "structured, systematic" foundational skills program for all students in the primary grades (pre-K or K–3). 	**INVENTORY THE COMPONENTS:** **Are assessments of foundational skills provided at regular intervals (at least weekly) with actionable follow-up depending on student mastery of discrete skills?** **Does it have an abundance of practice opportunities for phonics mastery for students who need a lot of reps?** *If either answer is no, the most important thing you can do is use a systematic, structured foundational skills program.*[3] **Does it have both basic and advanced phonemic awareness (most programs do not have the latter, as of 2020)?** *If no, consider using a stand-alone phonemic-awareness program in addition to a systematic, structured foundational skills program. A free easy-to-use and lively program can be found* here. **Does it teach and support the discredited three cueing system for word recognition?** *If it does, provide professional learning addressing why this is ineffective and how to replace it with a phonics-first approach.*	Investigate and select a more robust (structured, systematic, and comprehensive) foundational skills program to adapt and train on. There are free, open education resources footnoted below. There are also many commercial programs. Ask to see the research base and student results before selecting.
We have a research-based, knowledge-based program that includes structured systematic foundational skills. 	**INVENTORY THE COMPONENTS:** **Does it assess foundational skills at least weekly with actionable follow-up depending on student mastery of discrete skills?** *If not, request guidance and recommendations from the materials maker and ask them how this was omitted. You may be overlooking this part of the program, as this is uncommon.* **Does it have an abundance of practice opportunities for phonics mastery for students who need a lot of reps?** *If not, integrate resources for*	**AS REGULAR BEST PRACTICES:** After a skill is introduced and students have had a chance to practice it, students are assessed on that skill. How students do on each assessment drives next steps for personalized student work and follow-up using differentiated instruction. **Phonemic Awareness/Advanced Phonemic Awareness:** *Students who demonstrate mastery of current and past skills:*

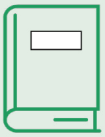
[3] Open (free) resources include Bookworms, CKLA Skills Strand, EL Education Foundational Skills, TN Best for All.

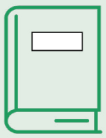
SCHOOL STARTING OUT	SHORT TERM STEPS...	LONG TERM STEPS...
We have a research-based, knowledge-based program that includes structured systematic foundational skills. [*continued*] 	*personalization, whether tech-based or human-enabled tasks, to quickly add additional at-bats and student practice.* **Does it have both basic and advanced phonemic awareness (most programs do not have the latter, as of 2020)?** *If not, consider using a stand-alone phonemic awareness program. A free easy-to-use and lively program can be found here.*	• Play oral sound games like building silly sentences with same first sound words or of onomatopoeia words (with peers or tech-enabled). • Listen to recorded books while following along.. *Students who are not yet demonstrating mastery of current and past skills:* Focused practice on challenge spots doing various phonemic manipulation activities (to build speed and accuracy until mastery is reached. **Phonics:** *Students who demonstrate mastery of new and previously introduced patterns:* • Read independently or with peers. • Free-write using known patterns correctly, inventing spelling to approximate patterns not-yet-learned. • Play word games via computer, paper & pencil, or socially. *Students who are not yet demonstrating mastery of new and previously introduced patterns:* • 1:1 tutoring • more opportunities for practice, in and out of context **Fluency:** *Students who demonstrate mastery of grade level text:* • Do Readers Theater or other fun activities that promote confident public speaking. • Prepare for formal public speaking (of practiced passages). • Read independently or with peers. • Free-write. • Do buddy reading that supports other students not yet fluent. *Students who are not yet demonstrating mastery of grade-level text:* • Engage in small-group or tech-enabled work that provides more reps

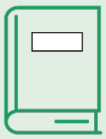
SCHOOL STARTING OUT	SHORT TERM STEPS...	LONG TERM STEPS...
We have a research-based, knowledge-based program that includes structured systematic foundational skills. [*continued*] 		with fluency while reading (programs like Amira or Read Naturally can be effective, but require human cheerleading!). · Do Readers Theater or other fun fluency activities that also promote confident public speaking. · Prepare for formal public speaking (of practiced passages).

Literacy Accelerator 2-5

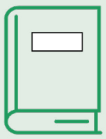
Knowledge, Vocabulary, Writing & Comprehension

SCHOOL STARTING OUT	SHORT TERM STEPS...	LONG TERM STEPS...
We use a basal reading program with lots of components. Foundational skills is one of them. It is structured but can get lost in the shuffle of the many demands. 	Teachers should focus on whole-class shifts that incorporate the literacy accelerators, to the extent possible, within the current program. *Knowledge Building & Volume of Reading (Accelerator 2):* · Implement available systems/ materials for accountable independent reading. Encourage reading of informational texts. · Use accountable independent reading as an opportunity to expand the textual variety so all students have the opportunity to both see themselves and learn about others/ new knowledge as they read. Consider having titles available in languages that represent the linguistic diversity represented in the community. · Develop short, knowledge-rich text sets connected to the module topics or tap into existing ones for students to read during independent reading time. · Design these to complement the topics of your units or around student interest. Make sure text set topics and ingredients represent a wide variety of viewpoints and cultural representations. · Organize your classroom libraries and small book by topic rather than	**FOR ACCELERATORS 2-4:** · When you can, adopt a knowledge-rich curriculum that is built on research findings and supports each literacy accelerator: Students and teachers will benefit most from a high-quality curriculum that attends to building word and world knowledge. · Until the materials makers expand their offerings, district and school teams should work to adapt materials to be culturally expansive while also responding to the specific needs and cultures represented in the community. · Attempting to developing these cultural fixes teacher by teacher will lack coherence and is too large a lift for teachers working in isolation. See the full Synthesis on Knowledge Building for more discussion of these questions and potential solutions. *Comprehension through close reading (Accelerator 5):* · Ensure a consistent school-wide discussion-rich approach to close reading instruction so that leaders can coach and support teachers and teachers can provide peer support. · A common set of tools, language, and approaches benefits students

SCHOOL STARTING OUT	SHORT TERM STEPS...	LONG TERM STEPS...
We use a basal reading program with lots of components. Foundational skills is one of them. It is structured but can get lost in the shuffle of the many demands. [*continued*] 	by the level of books and letting students choose to read about the topics they are interested in. To see how, go here. • Use tech-enabled programs to allow students to read a volume of texts on a topic. See Readworks Articles a Day sets (all resources free with registration) or Mindstar Books or Simple Wikipedia for examples of existing or easily modifiable resources. • Consider replacing a thematic fiction unit that covers a range of topics with a nonfiction unit focused on one topic. Do this once a quarter to build knowledge. Examples can be found in these Materials Guidance Documents for Reading Wonders or HMH Journeys.  *Vocabulary - in and out of context (Accelerator 3):* • Ensure read-alouds and close reading lessons include both drop-in vocabulary instruction and direct instruction of tier 2 vocabulary. • If possible, embed use of the Microsoft Immersive Reader for students who might need more support for in-the-moment definitions via their visual dictionary and read aloud functions. • Make use of tools such Wordsmyth or freethesaurus while working closely with text and encourage students to use them when reading on their own. • Emphasize morphology and polysemous words (words that have multiple shades of meaning). Play games such as Free Rice, Vocabulary Spelling City, or crosswords and charades, while increasing student exposure to high-value words and phrases. • If your instructional materials have stand-alone vocabulary study, utilize it. If it doesn't, consider supplementing with a high-quality choice such as Wordly Wise 3000. A list of well-vetted programs can be found at Common Sense Education.	and teachers alike. Building close reading lessons around interactive discussions engages students and is particularly good for English learners. • Explicitly model and expect a strong standard of coherence for all students while reading. • Ensure that many questions expect students to make bridging inferences and to make sense of the text as a whole so students can develop strong situation models during close reading. • Be explicit about the fact these practices and habits of mind transfer to all reading students do, not just during instructed practice.

SCHOOL STARTING OUT	SHORT TERM STEPS...	LONG TERM STEPS...
We use a basal reading program with lots of components. Foundational skills is one of them. It is structured but can get lost in the shuffle of the many demands. [*continued*] 	*Use of Evidence (Accelerator 4):* • If the majority of student discussion opportunities or writing prompts are disconnected from text, or are primarily narrative or opinion based, teachers should adjust writing prompts so that writing is in response to text, and there are common source materials and learning available to all students. • Ensure students support ideas and arguments with text-based evidence in both their discussions and in writing in response to text. • Note: this is an area where tech-enabled personalization could be enormously helpful in reducing the workload responding to student writing represents for teachers. See the full discussion in Accelerator 4: Text-Based Writing Has Untapped Power. *Comprehension Through Close Reading (Accelerator 5):* Basals generally have grade-level complex text passages in every week's lesson sequence. Ensure teachers use these texts with all students and give them the time and attention they need by: • Making close reading (multiple attentive reads to uncover layers and meaning in complex passages) of grade-level complex text a regular practice of ELA (if not current practice for all students already). Teachers can either leverage rich, grade-level texts and instructional guidance in the current materials for close reading or tap into an OER curriculum[4] for this portion of ELA. Make sure you are giving close reading of rich texts ample instructional time. • Stopping or greatly reducing the instructional time students spend in below-grade-level texts (leveled reading). • Organizing texts into topics and shifting to support knowledge-	

[4] Excellent vetted materials are available through: Bookworms, EL Education, Fishtank, Teaching Tolerance

SCHOOL STARTING OUT	SHORT TERM STEPS...	LONG TERM STEPS...
We use a basal reading program with lots of components. Foundational skills is one of them. It is structured but can get lost in the shuffle of the many demands. [*continued*] 	building (Accelerator 2) through a volume of reading, which is when students should be reading texts they can access largely on their own.	
We use a balanced literacy approach (Units of Study, F & P or have developed our own). 	Teachers should focus on whole-class shifts that incorporate the literacy accelerators, to the extent possible, within the current program. See this additional resource for a comprehensive, practical look at actions to take. *Knowledge Building and Volume of Reading (Accelerator 2):* · Reorganize your classroom library so books are no longer organized by levels but are organized by topic. To see how, go here. · Allow students to read topics of interest to them. · Offer and encourage reading of knowledge-rich nonfiction texts. · Use this as an opportunity to expand your library so all students have the opportunity to both see themselves and learn about others/new knowledge as they read. Consider having titles available in languages that represent the linguistic diversity represented in the community. · Develop short, knowledge-rich text sets based on student interest not current reading level, or tap into existing ones for students to read during independent reading time. · Use tech-enabled programs to allow students to read a volume of texts on a topic. See Readworks Articles a Day sets (all resources free with registration) or Mindstar Books or Simple Wikipedia for examples	**FOR ACCELERATORS 2-4:** · When you can, adopt a knowledge-rich curriculum that is built on research findings and supports each literacy accelerator: Students and teachers will benefit most from a high-quality curriculum that attends to building word and world knowledge. · Until the materials makers expand their offerings, district and school teams should work to adapt materials to be culturally expansive while also responding to the specific needs and cultures represented in the community. · Developing these fixes teacher by teacher will lack coherence and be too large a lift for teachers alone. See the full Synthesis on Knowledge Building for more discussion of these questions and potential solutions. *Comprehension through close reading (Accelerator 5):* · Ensure a consistent school-wide discussion-rich approach to close reading instruction so that leaders can coach and support teachers and teachers can provide peer support. · A common set of tools, language, and approaches benefits students and teachers alike. Building close reading lessons around interactive discussions engages students and is particularly good for English learners. · Explicitly model and expect a strong standard of coherence for all

SCHOOL STARTING OUT	SHORT TERM STEPS...	LONG TERM STEPS...
We use a balanced literacy approach (Units of Study, F & P or have developed our own). [*continued*] 	of existing or easily modifiable resources. • Develop short, knowledge-rich text sets for students to read during independent reading time. • Design these to complement the topics in science or social studies or around student interest. Text set topics and ingredients should represent a wide variety of viewpoints and cultural representations. • Encourage students to work in pairs based on interests  *Vocabulary - in and out of context (Accelerator 3):* • Ensure read-alouds and close reading lessons include both drop-in vocabulary instruction and direct instruction of tier 2 vocabulary essential to the text • Encourage students to use newly acquired words in their writing. Requiring students to use targeted academic words and phrases anchored in the texts they're reading as part of their writing and small-group discussions can increase students' experiences with the words and phrases and help cement those words in their working knowledge. • If possible, embed use of the Microsoft Immersive Reader for students who might need more support for in-the-moment definitions via their visual dictionary and read-aloud functions. • Make use of tools such Wordsmyth or freethesaurus while working closely with text, and encourage students to use them when reading on their own. • Give students responsibility to uncover the meaning of unknown words encountered in print by teaching them how to use the Academic Word Finder. • Emphasize morphology and polysemous words (words that have multiple shades of meaning). Play	students while reading. • Ensure that many questions expect students to make bridging inferences and to make sense of the text as a whole so students can develop strong situation models during close reading. • Be explicit about the fact these practices and habits of mind transfer to all reading students do, not just during instructed practice.

SCHOOL STARTING OUT	SHORT TERM STEPS...	LONG TERM STEPS...
We use a balanced literacy approach (Units of Study, F & P or have developed our own). [*continued*] 	games such as Free Rice, Vocabulary Spelling City, or crosswords and charades, while increasing student exposure to high-value words and phrases. • If your instructional materials have stand-alone vocabulary study, utilize it. If they don't, consider supplementing with a high-quality choice such as Wordly Wise 3000. A list of well-vetted programs can be found at Common Sense Education. • Emphasize morphology and polysemous words (words that have multiple shades of meaning). • If your instructional materials have stand-alone vocabulary study, utilize it. If they don't, consider supplementing with a high-quality choice such as Wordly Wise 3000.  *Use of Evidence (Accelerator 4):* • If the majority of student writing is in response to disconnected prompts, or is primarily narrative or opinion based, teachers should adjust writing prompts so that writing is in response to text, and there are common source materials and learning available to all students. Ensure students support ideas and arguments with text-based evidence in both their discussions and in writing in response to text. • Note: this is an area where tech-enabled personalization could be enormously helpful in reducing the workload responding to student writing represents for teachers. See the full discussion in Accelerator 4: Text-Based Writing Has Untapped Power.  *Comprehension Through Close Reading (Accelerator 5):* • Make close reading (multiple attentive reads to uncover layers and meaning in complex passages) of grade-level complex text available to all students regardless of current	

[3] Open (free) resources include Bookworms, CKLA Skills Strand, EL Education Foundational Skills, TN Best for All.

SCHOOL STARTING OUT	SHORT TERM STEPS...	LONG TERM STEPS...
We use a balanced literacy approach (Units of Study, F & P or have developed our own). [*continued*] 	reading level. • Make sure all students can have hands and eyes on grade-level text. • Make this a regular practice daily. • Either leverage existing rich, grade-level texts in current library for close reading or tap into an OER curriculum[5] for this portion of ELA. • If current program has students spending instructional time in below-grade-level texts (leveled reading), this practice should stop.	
We have a research-based knowledge-rich program, but little or no personalization. We want our texts and approaches to better reflect the cultures, backgrounds, and ethnicities represented in our community. We want to take advantage of newly learned research about the accelerators. 	Teachers should begin to implement personalization and choice of common tasks during a dedicated time where students receive support on a common task. • All students work on a project related to the core topic at the same time, but have a choice regarding the nature of the project.(essay, report, short story, song, poem...). • All students are encouraged to broaden the current topic/project offerings by investigating areas of knowledge, practice or culture that reflect backgrounds, lived experiences, and viewpoints of individuals in the class, tying them back into course themes and topics.  *Schools might prioritize:* • End-of-unit projects: Give students a choice on how to execute the end-of-unit projects. Prioritize topics and methods that affirm students' identity. • Working in teams (district, school, or grade-level) to adapt or swap out materials to be culturally expansive while also responding to the specific needs and cultures represented in the community. • Developing these fixes teacher by teacher will lack coherence and too large a lift for teachers alone. • Insure the expanded offerings fit in	• Rethink use of time: teachers begin to prioritize extended periods of time where student activities and the type of support vary. • Work blocks: Students have a work block and choose/cycle through what they work on (some do projects, some are reading, some do foundational skills). • Needs-based, specific differentiation: Students receive differentiated support based on need (some students get small-group support, while others have lighter-touch check-ins). • Schedule: Schools design their schedule intentionally to include personalization blocks created to meet specific needs and interests of students. • Expanding the walls: schools cultivate community opportunities for students to have co-ops, learning experiences, and divergent pathways to meeting grade-level standards and content requirements.

[5] Excellent vetted materials are available through: Bookworms, EL Education, Fishtank, Teaching Tolerance

SCHOOL STARTING OUT	SHORT TERM STEPS...	LONG TERM STEPS...
We have a research-based knowledge-rich program, but little or no personalization. We want our texts and approaches to better reflect the cultures, backgrounds, and ethnicities represented in our community. We want to take advantage of newly learned research about the accelerators. [*continued*] 	coherently with the knowledge rich curriculum in place. • Push your materials provider to expand or provide alternative texts to better represent the diversity of cultures, languages, and experiences represented in your school and that of the wider world. **Instructional Methods:** When there is choice for acquisition of knowledge, provide students choice over where, with whom, and how they acquire knowledge—individual, small groups, text-based, tech-based? *Comprehension Through Close Reading (Accelerator 5)* • Take advantage of the coherence of your instructional materials to ensure a consistent school-wide discussion-rich approach to close-reading instruction so that leaders can coach and support teachers, and teachers can provide peer support. • A common set of tools, language, and approaches benefits students and teachers alike. Building close reading lessons around interactive discussions engages students and is particularly good for English learners. • Explicitly model and expect a strong standard of coherence for all students while reading. • Ensure that many questions expect students to make bridging inferences and to make sense of the text as a whole so students can develop strong situation models during close reading. • Be explicit about the fact these practices and habits of mind transfer to all reading students do, not just during instructed practice.	

APPENDIX C | RECOMMENDATIONS FOR INVESTING IN RESEARCH ON EFFECTIVE PERSONALIZED LEARNING APPROACHES

There is promise in personalized learning, yet much of it is as yet unstudied and unproven. While personalized learning has been around for millennia, scant research on its efficacy exists in literacy. That's basic efficacy—defined as whether the treatment moves learning attainment at all compared to other conditions. In many studies, the variety of alternative treatments and conditions present makes it challenging to determine to what degree the personalized learning treatment was the major contributor to improved learning. It is our position that the field needs a major infusion of support for research and specific attention to the variation in outcomes across racial, socio-economic, and language demographics. Only then we will have solid evidence of the *effectiveness* of personalization approaches in schools and classrooms, and understand the impact of specific tools on students and their learning.

Significant additional research is needed on individual products or approaches in order to build a foundation for understanding what works to support student acceleration in literacy. Specifically, research is needed into the following four areas:

1. STUDENT EXPERIENCE

User experience studies and other qualitative studies are needed to better understand the positive and negative experiences of students with regard to personalized learning and how those experiences vary by student racial, social, and academic background. Additionally, studies are needed to better understand the features and impact of approaches that draw specifically on student motivation to accelerate literacy. These studies should pay careful attention to the extent to which outcomes vary based on student demographics and/or student starting points. This research needs to be published in academic journals and made widely available.

TOPIC	POTENTIAL RESEARCH QUESTIONS TO EXPLORE
STUDENT EXPERIENCE	· How do students experience various personalized learning approaches? · What is the relationship between a student's desire to participate in personalized learning and a student's experience and/or outcomes? · Given the likely variance in student experience—even with one product—what can we learn about how to build an approach that meets the varied needs and preferences of students?
STUDENT ENGAGEMENT	· Can personalizing literacy help support student engagement and sense of belonging at key transition points, particularly the most stressful (i.e., 8th to 9th grade)?
STUDENT MOTIVATION	· How do personalized learning tools or approaches impact student motivation and growth on literacy accelerators?

2. EFFECTIVENESS

Significantly more research is needed into the effectiveness of specific personalized learning products and approaches and how their effectiveness varies across students (by their academic and sociodemographic backgrounds) and contexts (schools, classrooms, teachers) in order to build our collective understanding of what approaches work best to accelerate literacy. This report uncovered scant evidence of the efficacy of personalized learning approaches in literacy.

Schools and school systems will need a coherent and well-rounded approach to literacy and will likely need to pull from multiple products and approaches to achieve this goal. It is critical to understand how various products and approaches work together and how effective they are in combination, as well as separately.

Finally, there are good opportunities to fund and study efforts to disband tracking through the equitable and personalized use of high-quality instructional materials.

TOPIC	POTENTIAL RESEARCH QUESTIONS TO EXPLORE
EFFICACY	· Does the hypothesis that personalizing the literacy accelerators will further boost student acceleration hold up? · Do specific personalized approaches pair well with specific accelerators? · What types[1] of personalization drive the strongest results for each literacy accelerator? · How does the student experience with products/approaches connect to the efficacy of that approach?
INTEGRATION OF PRODUCTS/ APPROACHES	· Are there combinations of various approaches and products that lead to intellectual richness and better student growth? · Are there particular personalized learning approaches or products that pair well with specific curricula? · What professional learning and support do teachers need to be able to effectively and equitably employ personalized instructional strategies and products?
FURTHERING EQUITY	· Can personalized use of high-quality instructional materials accelerate student literacy while dismantling the practice of tracking by ability?

3. CONTINUED DISCOVERY

There may be significant and relevant research conducted by product developers and/or technology companies into the effectiveness and/or student experience with personalized learning approaches. Supporting efforts to identify and bring such research into the public eye for stakeholders to know would be worthwhile.

TOPIC	POTENTIAL RESEARCH QUESTIONS TO EXPLORE
EXISTING RESEARCH	· What relevant efficacy research is currently held by private organizations such as content developers and/or technology companies?

[1] We find the Substitution, Augmentation, Modification, Redefinition (SAMR) model developed by Dr. Ruben Puentedura a worthwhile way to categorize types of educational technology approaches and products. Another way to categorize types of personalized learning is by the kind of practice(s) the product or approach employs (i.e., culturally relevant pedagogy, project-based learning, real-world problem solving, learner profiles, data-driven instruction, etc.).

4. BIAS IN BOTH TECH-ENABLED PROGRAMS AND HUMAN IMPLEMENTATION

We must understand the impact educator bias has on the design *and implementation* of both tech-enabled and human-enabled personalized learning approaches and what could work to mitigate these biases.

TOPIC	POTENTIAL RESEARCH QUESTIONS TO EXPLORE
BIAS	· What can we discover about the racial, gender and/or language biases built into personalized learning algorithms? What can be done to create greater equity within these algorithms? · How do the racial, linguistic, class or other identity biases of teachers impact the student experience and efficacy of personalized learning approaches or products? · What interventions are most promising to reduce the impact of these human biases?

5. RESEARCHER DIVERSITY

We conducted an independent analysis of the racial and gender diversity of the researchers whose work we have included this synthesis. These studies were conducted overwhelmingly by White men. There is a clear need to expand the field to include researchers with diverse identities and backgrounds, particularly to invite in researchers who better represent the diversity of students served in American classrooms. Doing so would enrich the educational research field by offering a greater diversity of perspectives.

TOPIC	POTENTIAL RESEARCH QUESTIONS TO EXPLORE
DIVERSITY	· How can the pool of researchers in literacy and personalization become more diverse so that new perspectives are available? · Are there paradigms that can better prioritize equity as a goal of research?