# Growing Knowledge Matters. A Lot.

## 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.

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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.

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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).

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## 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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