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CHAPTER 3

The Importance of Vocabulary and Knowledge in Comprehension

By David Liben

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Introduction

The roles of vocabulary and knowledge in students' reading comprehension have long been overlooked in practice despite extensive research attesting to their importance. Instructional focus has instead been on the teaching and learning of discrete skills and strategies, often out of context, with the unrequited hope that they would transfer from one text to the next. Skills and strategies do indeed have a role to play in increasing students' reading comprehension, but their value pales in comparison to that of vocabulary and knowledge.

Failure to understand and act on this fact renders many students unprepared for college and workforce training as they depart high school. In particular, students from families with lower levels of formal education and students whose first language isn't English frequently enter K–12 schooling with less knowledge of words, less academic

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domain knowledge, and less general knowledge of the world than do their peers. As we'll see, word, domain, and world knowledge are essential to proficient reading comprehension, increasingly so as texts become more complex in higher grades. Our failure to address this situation is one of the primary causes of the continuing gap in performance between struggling readers and their classmates who are able to access readings at or above their grade level.

Reading comprehension, in short, is fundamentally not a skill that transfers from one text to the next. This is so primarily because of the variable demands different texts place on readers' vocabulary and knowledge. This chapter will build an understanding of the centrality of vocabulary and knowledge to students' academic success and share some ideas for how best to expand both, with a focus on reading.

Proficient Reading Comprehension Isn't a Skill

Typing, welding, and playing chess are among the many activities we commonly think of as skills. In the normal course of events, practicing any of these translates to increased proficiency, and that proficiency transfers to various settings and situations where that activity is performed. If you can type on one keyboard, you can, with minimal adjustment, type on most others. If you can weld metal shelving successfully, there's a good chance you can use welding to repair a hole in a car's exhaust system. If you can play chess at a local club, you can play chess equally well at a friend's house.

Some foundational aspects of reading, most notably decoding, are similarly skill based and transferable. Decoding—accurately and quickly recognizing a word you know in print—is trainable and broadly applicable. Once students can decode, they can recognize known words in any legible font and in both upper- and lowercase letters; they can even decode nonwords that follow regular phonetic patterns they've mastered (e.g., *quape*, *tranging*, *cround*). Once students reach a certain level of decoding skill and reading fluency (the ability to read aloud with accuracy, reasonable speed, and appropriate expression—for proficient readers, usually around sixth grade), they can swiftly decode and smoothly read most texts aloud (highly technical or archaic ones excepted). Reading aloud smoothly means students will likely "read in their head" at an appropriate rate and pronounce most words correctly whether or not they know the meaning.

By contrast, reading *comprehension*, the point of learning how to read, isn't a transferable skill. Being able to comprehend *Cat in the Hat* doesn't mean you can comprehend *Beloved*, *Silent Spring*, or science articles from *Nature*.

Why not?

A typical sixth grader who decodes accurately without hesitation and reads fluently at grade level could likely accurately read aloud the sentence *His bearing was as malicious as his words were spiteful* but with little if any comprehension. Similarly, a typical eighth grader who decodes well and reads fluently would still likely not comprehend the sentence *The adverse feedback loop, in which losses by fiduciary lenders lead to tighter credit availability, which then leads to lower spending by households and businesses, has begun to slow.* For typical sixth graders, little or no understanding of the words *bearing*, *malicious*, and *spiteful* (even if pronounced correctly aloud or in their head) would make comprehension of the first sentence difficult if not impossible. For most eighth graders, lack of knowledge of the banking system or macroeconomics would make comprehension of the second sentence similarly difficult or impossible.

Vocabulary

The relationship between vocabulary and reading comprehension has been understood for nearly a century (Whipple 1925). Jeanne Chall, a prominent Harvard literacy researcher working in the late twentieth century, observed that vocabulary is, in fact, so strongly correlated with reading comprehension that there exists no real need for separate comprehension assessments (Chall and Jacobs 2003).

In 2002 Isabel Beck, Margaret McKeown, and Linda Kucan introduced the notion of dividing up all words and phrases in English into three tiers as a way to create priorities within vocabulary instruction. In this scheme (Beck, McKeown, and Kucan 2013), tier one words and phrases (e.g., *family*, *fun*, *games*, *table*, *cracker*) are basic vocabulary and are commonly learned by children through everyday discourse. Though young students won't necessarily learn all tier one words and phrases at the same rate, they'll learn almost all of them sooner or later. Tier three words and phrases (e.g., *membrane*, *perimeter*, *manifest destiny*, *checks and balances*, *metaphor*) are used less frequently, and seldom in everyday conversation, and are generally specific to particular domains of knowledge (e.g., biology, geometry). Thus, they tend to appear in texts of only certain subjects, such as *tectonic* in geology texts (though tier three words and phrases sometimes "jump domains," as in *The election results signaled a tectonic shift in voter attitudes*). Tier two words and phrases (e.g., *influence*, *produce*, *variety*, *exclusive*, *particular*) are likely to appear in a wider variety of texts than are tier three words and phrases and, unlike their tier one counterparts, appear with increasing frequency the more sophisticated that text gets. Tier two words and phrases don't have a home in any one academic subject since they occupy texts universally. While subject area teachers are eager to

teach the tier three words and phrases that are the province of their disciplines (since these words and phrases often name the concepts in their fields) and while tier one words and phrases tend to be acquired through everyday discourse, tier two words and phrases are in danger of being left unattended, the responsibility of no one. Before the advent of college and career readiness standards, which shone a spotlight on the centrality of vocabulary and called out the special place of tier two ("general academic") vocabulary in students' K–12 and post–high school success, teachers tended to assume their students already understood the meaning of words and phrases in this category. If teachers thought about tier two words and phrases at all, they probably underestimated the frequency with which such vocabulary appears in the texts they assigned and failed to grasp the disproportionate role these words and phrases have in conveying texts' meaning (Snow 2010; Adams 2009). Tier two words and phrases had been the orphans of secondary school instruction.

Vocabulary shortcomings don't affect all students equally. Lily Wong Fillmore, who spent her career studying English language acquisition at the University of California, Berkeley, has frequently noted that while nobody is born fluent in academic English, children from well-educated families learn much of it at home from being read to, an advantage that accelerates as these children gain proficiency in reading and start to read broadly on their own (Urrutia, Elliott, Fillmore, and Calderón 2013; see also Stanovich 1986; Cunningham and Stanovich 1998). Teachers working in low-income settings, for example, might recognize the truth of this observation in their bright, hard-working students who have the motivation to enroll in advanced classes but struggle mightily in part because they don't possess the tier two vocabulary to understand even the questions on standardized prompts.

HOW TO TEACH VOCABULARY, WITH PARTICULAR ATTENTION ON TIER TWO WORDS AND PHRASES

Vocabulary can be learned directly and indirectly. Direct vocabulary instruction can involve teacher-led lessons on words and phrases found in texts that students are reading as well as exercises, activities, and games that introduce words and phrases distinct from those in assigned texts. Direct instruction might involve the use of vocabulary workbooks or standalone vocabulary programs, such as *Wordly Wise*, a series popular in private schools. Indirect learning of new academic words and phrases happens when students independently acquire the meaning through context, primarily during reading on their own or listening to text read aloud. The known words and phrases surrounding an unfamiliar term are the contextual clues used by students to start to ascertain the meaning of the unknown word or phrase. In order to maximize vocabulary growth, a combination of direct and indirect acquisition is needed. This is so for

a number of reasons, but the primary one is that students need to both broaden and deepen their vocabularies.

Breadth of vocabulary refers to the number of words and phrases in students' lexicons, more specifically the words and phrases whose meaning students have anywhere from a general sense to a full understanding of. When people refer to "vocabulary instruction," they're typically talking about expanding breadth. *Depth of vocabulary*, on the other hand, pertains to how much students know about a given word or phrase. This includes the extent to which students know what cognitive psychologists refer to as the *senses* a word or phrase possesses. The word *admit*, for example, has numerous senses: *Texas was admitted to* (allowed into) *the Union*; *he admitted* (conceded) *his error*; *the patient was admitted* (accepted into the hospital) *for treatment*. Depth of vocabulary also pertains to knowledge of various dimensions of a word or phrase: its morphology (affixes, roots, inflections, derivations, and compounds), orthography (spelling), phonology (pronunciation), part(s) of speech, and etymology (origin).

Breadth and depth of vocabulary are both important to understanding why, say, an author chooses one word or phrase over another. Why, for example, might an author have written *She* ***admitted*** *her error* as opposed to *acknowledged*, *confessed*, *proclaimed*, or *came clean about*? Examining an author's word choice requires a combination of attention to context and reasoned speculation about authorial intent. The skill of analyzing word choice rhetorically can best be taught to those students not yet possessing a nuanced grasp of words and phrases through practice in close reading. Depth of vocabulary knowledge could, for instance, grow out of a group discussion about an author's word choice in a given instance. Although students who come to the discussion with broader and deeper vocabularies would have an initial advantage, the social nature of the classroom exchange means that students starting with less knowledge would learn about alternative word/phrase choices and what distinguishes related words and phrases from one another via the discussion itself. Whatever their initial vocabulary knowledge levels, all students would benefit from the activity of placing the focal word or phrase in a network of related words and phrases conveying (to continue our earlier example) the various ways in and degrees to which individuals address fault through word choice (and word choices not made).

A series of seminal studies in the mid- to late 1980s and early 1990s (Nagy, Herman, and Anderson 1985; Nagy, Anderson, and Herman 1987; Anderson and Nagy 1993) addressed the question of how many words students know. Out of this work came the finding that typical students over the K–12 span were learning between two thousand and three thousand words a year, and many students significantly more. Yet even the conservative rate of two thousand words a year would be

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substantially beyond what students could learn from direct instruction during school. This body of work also showed that students starting off with greater stores of vocabulary learned more words each year than those students starting off with smaller vocabularies. This pattern continued through high school, contributing to a widening gap in reading scores—an instance of the so-called Matthew effect in which advantage accumulates over time (Stanovich 1986). Given the instructional demands in the school day, there's not enough time for direct vocabulary instruction to significantly narrow this gap; as a result, indirect vocabulary learning must play an important role.

Since such learning takes place primarily through reading, it's worth asking how much reading students should do. Despite research on the importance of students reading, we have none on how much is needed to achieve proficiency. There are clues from practice, however. Students in honors and other advanced classes in high school read far more in all their classes than do students in lower-track classes (Mayer, LeChasseur, and Donaldson 2018). Honors/advanced students also have greater breadth of vocabulary than do their peers (Cunningham and Stanovich 1998; Stanovich 1986). Their advanced-course participation is made possible by greater capacity for reading and richer vocabularies; in turn, success in these challenging courses accelerates these students' academic advantages—another instantiation of the Matthew effect. These students also do better on college readiness assessments as well as in college itself (Cromley and Azevedo 2007; Mayer, LeChasseur, and Donaldson 2018; Stanovich 1986; Oakes and Guiton 1995; Slavin 1990).

My many years observing classrooms give additional clues to the reading students in general should be doing to be geared toward K–12 and postsecondary success. In social studies classes, honors/advanced students read a combination of textbooks, secondary sources, and primary sources. In science, they read a mix of research, textbooks, and lab instructions. In English, they read full-length works, likely in conjunction with literary criticism and literary nonfiction essays. These practices clearly provide a substantial range as well as volume of reading, which add considerably to students' knowledge and their ability to access more texts in these domains. It's these honors/advanced students, too, who are disproportionately admitted to selective colleges, score higher on admission exams, and get better grades. Students in lower tracks, by contrast, tend to receive essential information via slideshow presentation or video and be assigned fewer readings than students in higher academic tracks. Yet lower-track students would need to read at least a similar volume and range in middle school and high school classes just to keep from falling even further behind.

This, however, is far from our current reality, as two recent studies, on tracking and on quality of assignments, attest. Mayer, LeChasseur, and

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SAT Suite Connections

Vocabulary is a critical component of the SAT Suite Reading and SAT Suite Writing and Language Tests and the optional SAT Essay. The Reading and the Writing and Language Tests maintain a strong focus on tier two ("high-utility academic") words and phrases—the powerful, versatile vocabulary that's critical for unlocking the meaning of texts (especially complex texts) across the curriculum and for college and career readiness and success more generally. Questions associated with each Reading Test passage will ask students to determine the meaning of a word or phrase in context, analyze an author's word choice in context, or both. Questions associated with each Writing and Language Test passage will ask students to make revisions that improve the precision and concision of language, establish or maintain contextually appropriate style and tone, and combine sentences or parts of sentences to enhance meaning and flow. Students' performance on these Reading and Writing and Language questions determines their Words in Context subscore. On the Essay, students' Writing scores are based in part on the degree to which their responses exhibit sentence variety, precision of word choice, and a formal style and objective tone.

The SAT Suite Reading, SAT Suite Writing and Language, and SAT Essay tests measure students' reading, analysis, writing, and language skills and knowledge. While these tests aren't measures of students' knowledge in the subject areas they sample (e.g., history/social studies, science), they do call on students' developed abilities to

Donaldson (2018), analyzing how teachers teaching both higher- and lower-track classes treat their students, found that, with exceptions, the teachers set lower expectations for and gave less support to lower- than to higher-track students. Researchers with TNTP, after observing hundreds of classrooms in five school systems, examining around five thousand assignments and over twenty thousand student work samples, and gathering about thirty thousand student surveys, found that "while students succeeded on more than two-thirds of their assignments, they only demonstrated success against the grade-level standards 17 percent of the time on those exact same assignments" because "so few assignments actually gave students a chance to demonstrate grade-level mastery" (2018, 21). Although these circumstances are pervasive, the TNTP researchers found disproportionate impacts on some student groups, including students of color and students from low-income backgrounds. The researchers identified four key resources "at the heart of high-quality academic experiences for students": "consistent opportunities to work on grade-appropriate assignments," "strong instruction that lets students do most of the thinking in the lesson," "a sense of deep engagement in what they're learning," and "teachers who hold high expectations for students and truly believe they can meet grade-level standards" (23). Availability of these resources helped all students, the researchers found, but was especially beneficial to students behind grade level, allowing them to make substantial academic gains. However, they note, students of color and students from low-income backgrounds received less access to the key resources, even when prior academic achievement was controlled for. For example, while only 12 percent of classrooms made up of mostly white students had no grade-level assignments at all, 38 percent of classrooms made up of mostly students of color had no such assignments (27). What's more, the researchers found more within-school variation than between-school or between-district variation in terms of access: "The average classroom in our top quartile for assignment quality, for example, provided students grade-appropriate assignments 49 percent of the time. But *within the same school*, the average bottom-quartile classroom did so only 13 percent of the time" (45; emphasis in original).

As discussed above, direct vocabulary instruction can't teach students all the words and phrases they need to be successful in K–12 schooling and beyond. Therefore, direct instruction must focus on those aspects of vocabulary that are most productive. Morphology is one such aspect. Nagy et al. estimated that in the middle grades and beyond, "more than 60% of the new words that readers encounter have relatively transparent morphological structure—that is, they can be broken down into parts" (1989, 279). Cultivating an awareness of morphology would thus clearly support the learning of new words when students read independently. Consider the following sentence from Annie Dillard's essay "Living Like

SAT SUITE CONNECTIONS (CONTINUED)

read and comprehend appropriately challenging texts in these areas, to use critical reasoning and analytical skills developed in subject area courses, and to apply their skills and knowledge to questions and tasks commonly associated with the various subjects. Knowledge building in the subject areas thus lays the foundation for success on the tests and, more importantly, for the post–high school educational opportunities the tests' requirements mirror.

Weasels": *It caught my eye; I swiveled around—and the next instant,* ***inexplicably****, I was looking down at a weasel, who was looking up at me* (1983, 67; emphasis added). Students who know that the prefix *in-* means "not" and can surmise that the word *explicate* is linked to the word *explain* and—equally important—are in the habit of making such connections would likely be able to figure out the meaning of *inexplicably* on their own.

In addition to morphology, direct instruction should prioritize attention to the words and phrases most academically useful—in particular (1) abstract, multiple-sense words and phrases students are less likely to learn the meaning of on their own (Adams, Bell, and Perfetti 1995; Adams 2010–2011)[1] and (2) words and phrases essential to understanding assigned texts. Over time, as a student is consistently exposed to complex texts, these words and phrases will come to form the student's own corpus of high-value vocabulary. As each student's corpus grows, the ability to comprehend complex text will grow along with it.

For more on vocabulary instruction, see "Which Words Do I Teach and How?" from Achieve the Core (https://achievethecore.org/page/61/which-words-do-i-teach-and-how). For a free tool to help select high-value words from any text excerpt, see the Academic Word Finder tool, also from Achieve the Core (https://achievethecore.org/academic-word-finder/; free registration required to use some features).

Knowledge

During the roughly twenty years since Walter Kintsch (1998) published *Comprehension: A Paradigm for Cognition*, cognitive scientists' models of reading comprehension have been based on what Kintsch called the *textbase* and the *situation model*. The textbase is the literal understanding of what the text says; the situation model is the deeper, more complete understanding that comes from the reader integrating background knowledge with the textbase.

For example, a text describing the discovery of a set of fossils with unique body parts could provide information on when and where the fossils were discovered, how old they are, who discovered them, the reaction of other scientists to the discovery, the probable function of the body parts, and the general body plan suggested by the fossils. A reader's

[1] Victor Kuperman, Hans Stadthagen-Gonzalez, and Marc Brysbaert have demonstrated this empirically by obtaining "age-of-acquisition norms" for tens of thousands of English words. For example, "water" has a mean rating (age of acquisition) of 2.37, while "abstraction" itself has a mean rating of 13.65. The researchers have compiled a page (http://crr.ugent.be/archives/806, last updated November 2017) from which the results can be downloaded as a spreadsheet. For the methodology, see Kuperman, Stadthagen-Gonzalez, and Brysbaert. 2012. "Age-of-Acquisition Ratings for 30 Thousand English Words." *Behavior Research Methods* 44, no. 4 (December): 978–90. https://doi.org/10.3758/s13428-012-0210-4. In addition, the Academic Word Finder at Achieve the Core (https://achievethecore.org/academic-word-finder/) can identify words from a text at a given grade level using a suite of databases similar to age-of-acquisition databases. Using that tool reveals that abstract words are, in general, associated with higher grade levels.

mental representation of this information constitutes the textbase. A full understanding—a situation model—would require knowing the role fossils play in evolutionary theory, the significance of a discovery of heretofore unknown body parts, why fellow scientists might react strongly to such a discovery, and some sense of the history of disputes regarding previous fossil finds. This deeper understanding of the subject (the development of a situation model) comes from the integration of background knowledge and information gleaned from the text along with the motivation to reach a full understanding of the new information. Development of the situation model is facilitated by the use of strategies, such as monitoring for comprehension, rereading, asking questions, paraphrasing to verify or cement comprehension, summarizing while reading, and making reasonable "bridging" inferences when the reader notices that meaning is becoming opaque.

Developing a situation model for literary texts works the same way. A memoir of a young man's voyage of self-discovery via a European tour that included seeing productions of Shakespeare plays might briefly describe the plays, catalog the young traveler's reactions to each play, reference the European landmarks the traveler encountered during the journey, and explore the traveler's motivation for undertaking the trip. An understanding of this information at the surface is essential prior to a more complete understanding of the text (and teachers shouldn't assume that all students immediately grasp the basics). A fuller understanding requires having some sense of the place Shakespeare holds in Western culture, being aware of the concepts of self-discovery and coming-of-age journeys, and possessing enough knowledge of Shakespeare's works to see why Shakespeare might be both illuminating and inspiring to a young man. To develop a situation model of the memoir, then, a reader, like the reader of the fossil text, has to integrate textual and background information successfully using various strategies and to remain motivated to do the work required to achieve comprehension.

This meaning-making process takes place at local levels as well as globally; without the requisite knowledge, comprehension suffers (McNamara and Kintsch 1996). Daniel Willingham (2006), a cognitive scientist who studies K–12 learning, offers this example: *John's face fell as he looked down at his protruding belly. The invitation specified "black tie" and he hadn't worn his tux since his own wedding, 20 years earlier*. A reader unfamiliar with the meaning of *face fell* or *black tie* or how male waistlines tend to expand over the decades would struggle to understand what's happening in this snippet, let alone derive a sense of why John might be feeling dismayed. A student who failed to grasp this small, local corner of a text would find their comprehension deteriorating and their ability to grasp the global meaning of the text curtailed.

Knowledge supports comprehension in a variety of ways: knowledge strengthens readers' ability to generate the inferences from text that lead to high-level comprehension, it enhances readers' ability to combine information from parts of a text (or multiple texts) into a coherent understanding, and it allows readers to integrate textual information with their prior knowledge.

Knowledge can be particularly helpful to less skilled readers. Readers with greater knowledge, regardless of their level of reading proficiency, have to expend less effort to understand a text, which means that less proficient readers can use knowledge to make up for shortcomings in their reading skills, such as low fluency or lack of useful reading strategies. The well-known "baseball study" (Recht and Leslie 1988) dramatically demonstrates this. The researchers found that students in eighth grade with low reading scores but a great deal of knowledge about baseball did as well as students with high reading scores but less knowledge of baseball on a reading comprehension test that had baseball as the subject of each of its passages. The supporting effect of knowledge with any sort of text holds true for both younger and older students (Guthrie, McRae, and Klauda 2007). Concept-Oriented Reading Instruction (CORI), a body of work by John Guthrie and colleagues, has demonstrated that literacy instruction focusing on learning different topics (e.g., habitats, explorers, animal adaptations) supports weaker readers, enhances motivation, and yields greater gains in all students' scores on standardized reading comprehension tests relative to students receiving literacy instruction that doesn't focus on learning different topics (Guthrie et al. 2009).

While knowledge enhances reading comprehension, it's not always a prerequisite; the act of reading itself enhances and expands knowledge. The fossil text discussed earlier may not fully explain how fossils are discovered, but an interested reader without background knowledge of fossil discovery would still gather from the account some idea of how such discovery happens. Similarly, the text's depiction of how scientists responded to the discovery could help illuminate for the less knowledgeable reader how science works and offer insights into the importance of fossils to an understanding of evolution. The text would certainly be easier to process for a student who has relevant background knowledge, but a student sufficiently motivated by the subject and desirous of learning more about it can gather plenty from the text alone. Further, that student will carry that learning into the next text about fossil discovery or paleontology.

The concept of the situation model and the essential role of knowledge in comprehension are universally accepted by cognitive scientists who study reading (Britton and Graesser 2014). These notions, however, haven't gotten to most educators in a form that allows for powerful

"Knowledge can be particularly helpful to less skilled readers. Less proficient readers can use knowledge to make up for shortcomings in their reading skills, such as low fluency or lack of useful reading strategies."

classroom application. Although many teachers have a general sense of the importance of knowledge to reading comprehension, they've tended to emphasize *activating* background knowledge instead of *growing* it through reading as described above. This is a problematic framing of the matter, as it can lead to well-intentioned but ultimately unhelpful preteaching activities that can quickly absorb swaths of classroom time and shift the instructional focus away from the rich text that should be the center of attention. Moreover, given that the text, if carefully and closely read, can itself be a source of knowledge, this preteaching deprives students of the opportunity to grow knowledge from reading. Finally, undue emphasis on the need to build background knowledge prior to reading may also lead teachers to lower the text complexity levels they expose students to on the grounds that students simply don't know enough to handle challenging readings and that it would be too difficult to impart that knowledge to them. In short, teachers who aren't conscious of how to seize opportunities to grow new knowledge through reading are, in a scenario that plays out daily in many high school classrooms, likely to shortchange their students by keeping them from appropriately challenging text and inhibiting them from acquiring knowledge from text.

Implementation Advice

A key instructional implication is that teachers need to find ways to integrate series of conceptually cohesive texts on a topic into instruction as early and as often as possible in the K–12 continuum. Landauer and Dumais (1997) have developed a computerized model of reading that predicts vocabulary growth based on the relationship between words and topics in texts. The model shows that word growth through reading a series of texts on a topic increases the breadth and depth of students' vocabularies as much as four times more than would engaging in readings that jump from topic to topic. Independent of that work, Cervetti, Wright, and Hwang (2016) gave one group of students six texts on the topic of birds and another group six texts of equal complexity on six separate topics. The researchers embedded the same tier two words and phrases in each set of texts. Tests of word learning were then administered to both groups. Results showed that the students who read the set of texts on birds learned significantly more of the embedded tier two words and phrases than did their counterparts. In addition, their newfound vocabulary knowledge persisted over months, whereas the knowledge of the meaning of the fewer words and phrases attained by their peers deteriorated over the same follow-up period. The researchers concluded that the enhanced knowledge of the topic built up over the course of reading the six texts on a single subject supported greater vocabulary growth. It's important to note that the bird texts the researchers used were conceptually cohesive: rather than employing six random texts on birds, the researchers began with an introductory

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College and Career Readiness

Strong evidence for the importance of vocabulary to postsecondary readiness and success can be found in data from the College Board's 2019 National Curriculum Survey Report.

The sample of 1,377 postsecondary faculty in English, social science, and science gave a grand mean importance rating of 2.99 (on a four-point scale, with 4 being "very important") to a subset of skill/knowledge survey items associated closely with the meaning and use of words and phrases in context. This sample also gave high ratings to a number of survey items related to vocabulary: 3.30 to determining the meaning of words and phrases using context clues, 2.96 to determining how word choice or language patterns shape meaning and tone in text, 3.40 to ensuring precision of language, 3.21 to ensuring concision of language (i.e., avoiding or eliminating wordiness and redundancy), 3.13 to establishing and maintaining an appropriate style and tone for task, purpose, and audience, and 2.75 to using various sentence structures to achieve particular rhetorical effects, such as emphasis.

For more information on the College Board's national curriculum survey and its results, see the general introduction to this collection.

text that described types of birds and followed up with various texts explicating specific subtopics (feathers, reproduction, nest building, migration, and conservation).

Possibly as a result of this research and possibly because college and career readiness standards have emphasized knowledge building, the concept of text sets has recently gotten a good deal of attention. Among the free resources available for teachers is a project hosted by the Digital Public Library of America (**https://dp.la/primary-source-sets**) that makes available a searchable database of collections of primary source documents. These documents can be used to supplement course textbooks, with the textbook providing an overview of a topic and the primary sources providing more nuanced, specific, and detailed views. For example, a history textbook chapter on the aftermath of the U.S. Civil War could serve as a good grounding for a text set on the Freedmen's Bureau or the Fifteenth Amendment, either of which, in turn, could provide a more textured view of the specific topic than could the textbook alone. Similarly, learning the basic rock types and their origins from an Earth science textbook would directly support the study of a text set on the geology of any region from Newsela (**https://newsela.com/text-sets/**; free registration required). Another free resource site is CommonLit (**https://commonlit.org**; free registration required), which has high-quality texts and a focus on literary works frequently taught in secondary grades along with questions and prompts aligned to college and career readiness standards.

Videos, informational graphics, and other nonprint texts can profitably be included in sets along with print texts. Text complexity should be taken into consideration as well when teachers construct or find sets. Texts can be arranged coherently and with texts of lesser complexity early in the sequence supporting later, more complex texts, or texts can be at a single complexity level accessible to most students, with supports provided for weaker readers. (For a fuller treatment of text complexity, see chapter 1.) Text sets can be incorporated into any subject area. For examples of text sets and more detail on how to create them, see "Text Set Project: Building Knowledge and Vocabulary" from Achieve the Core (**https://achievethecore.org/page/2784/text-set-project-building-knowledge-and-vocabulary**).

A full-length nonfiction text on a topic can provide the same benefit as a conceptually cohesive text set, yet the former is rarely used in general-track classes. The chapters in such a text are designed to be conceptually cohesive and function analogously to the separate pieces of a text set. Incorporating full-length nonfiction (or other types of full-length works, such as historical fiction) into courses can greatly increase subject knowledge and vocabulary gains whether the works are studied

in class or assigned as independent reading (Landauer and Dumais 1997; Cervetti and Hiebert 2015).

Volume of reading is itself a consideration. Reading extensively maximizes increases in the words and phrases a reader knows—the breadth dimension of vocabulary acquisition discussed at the outset of this chapter (Cunningham and Stanovich 1998). Though any reading is valuable for vocabulary growth, readings focused on a single topic, as discussed above, enhance vocabulary growth, an efficiency that should be taken advantage of whenever possible. Deepening students' word sense and awareness of how words work (depth of vocabulary) is best approached through close reading (the subject of chapter 2).

Words and phrases differ in how hard they are to learn. Concrete words (*fortress*, *canister*, *ballast*) can be taught by analogy and mastered quickly. Biemiller (2010) discusses the concept of "drop-in words," words in a reading that aren't necessarily essential to understanding the text but that can be taught with a quick thirty-second explanation. These words tend to be concrete, name known concepts, or have synonyms many students likely already know, so they're easy additions to vocabulary even though they're sometimes esoteric, such as *preclude* (stop from happening, prevent) and *erratic* (changeable, unreliable). Biemiller's research supports the efficiency of this approach as a way to rapidly grow vocabulary. He attributes the "stickiness" of words learned in this way to the availability of a straightforward definition and the way in which the new word is wrapped in a context that makes sense of the meaning once students are informed of the definition. Teachers can find it valuable to get into the habit of "dropping in" definitions for newly encountered words as a matter of course in their classrooms.

Over the years, teachers have developed a variety of ways to directly teach vocabulary. A good source that has collected many of these methods and offers guidance on how and when to use them is the vocabulary resource section of Achieve the Core (**https://achievethecore.org/page/974/vocabulary-and-the-common-core**).

Of the techniques discussed in this chapter, the use of text sets represents the most substantial shift in practice, as it involves gathering and purposefully arranging conceptually cohesive texts of varying complexities or at a single, median level on a single topic. But it's work worth doing, as it has clear payoffs in terms of subject matter mastery and vocabulary acquisition. Quick vocabulary coaching, such as Biemiller's approach, is comparatively effortless once a teacher learns to spot good opportunities and cultivates the habit of mind to intervene in this high-impact way.

The Common Core State Standards' emphasis on tier two vocabulary has increased attention given to vocabulary instruction in elementary

and middle school, though whether this has yet escalated to high school instruction is not as clear (Swanson et al. 2016). For the most part, this emphasis has involved direct instruction of vocabulary; indirect acquisition through a significant volume of reading hasn't gotten the attention it deserves because the value of acquiring knowledge itself hasn't gotten the attention it deserves (Cervetti and Hiebert 2015). A high volume of reading, whether achieved via text sets, full-length nonfiction, textbook use, or a combination, merits more attention, as regular reading serves the dual purpose of growing knowledge and maximizing vocabulary growth. Because of this double payoff, and because the research implications aren't as well known, indirect vocabulary acquisition through a substantial volume of topically connected reading has gotten the bulk of the attention in this chapter relative to direct instruction. The latter topic is addressed in some detail in chapter 2, on close reading and source analysis.

Conclusion

Vocabulary and knowledge are both essential ingredients of reading comprehension. The size of students' vocabularies and their stores of general knowledge are neither fixed nor inevitable; they are, in fact, highly mutable. The introduction of instructional practices such as the use of text sets and full-length nonfiction combined with shifts in practice involving the deliberate teaching of words and phrases via close reading and casual interjection can make classrooms places where students increase their knowledge of words and of the world and become stronger readers. But there has to be a conscious decision on the part of teachers and developers of instructional materials for this shift in practice to happen.

Failure to address gaps in students' vocabulary and knowledge, particularly for students from low-income and ethnic minority families, which generally have lower levels of formal education and/or whose members are still learning English, is one of the primary reasons for the persistence of and even increase in the gap between proficient and nonproficient readers as students move into higher grades. The consequences of inaction are lower levels of K–12 achievement and lower rates of preparedness for postsecondary education, which in turn create a need for expensive and, at least in traditional forms, often ineffective remedial/developmental classes (U.S. Department of Education, Office of Planning, Evaluation, and Policy Development 2017; Xu 2016). These consequences, which fall disproportionately on certain groups of students, are ones that our nation can no longer afford and should no longer tolerate.

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