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## How Knowledge Powers Reading

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**To help students master nonfiction reading, we must design instruction that builds their background knowledge.**

Want to become a doctor? An economist? An engineer? You'd better be prepared to read articles, primary source documents, research studies, and complex essays. The same is true for shorter-term goals, like scoring well on the new SAT. In other words, success in scholastic and professional endeavors requires the ability to learn from the literature of a discipline.

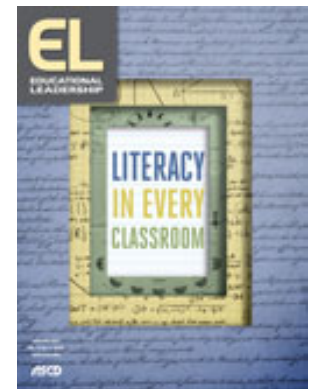
Clearly, it's important to ensure that all students can read and master nonfiction texts—but it's also challenging. Nonfiction doesn't follow the "problem, rising action, resolution" conventions of fiction that students are familiar with from novels, movies, and TV sitcoms. With the exception of memoir and biography, nonfiction rarely tries to win the reader's interest with an engaging narrative voice. The tone is more often something like, "I've got some information here; stay with me if you can."

But the biggest challenge—and the most important—is this: Recent research shows that reading comprehension, deep thinking, and even creativity all rely heavily on prior knowledge. Although you can find a thousand articles claiming that knowledge is essentially irrelevant nowadays—that mere facts are not worth teaching in the age of Google, when anyone can look up anything at any time—in fact, cognitive scientists now mostly believe that this apparently tidy logic is wrong (Allington & Cunningham, 2006; Deans for Impact, 2015; Willingham, 2006). The brain's active processing capacity is finite, so unless knowledge is encoded in long-term memory, having to search for it actually crowds out other forms of cognition. Knowing things helps you think and read successfully.

At the same time, reading is a primary way to come to know things. Every time we read and comprehend a text, we add to the knowledge that helps us make sense of further texts.

In other words, when it comes to reading, knowledge is both the chicken and the egg. Our students' ability to read nonfiction texts depends on their prior knowledge, and the act of reading nonfiction adds to their knowledge base and helps them learn more from subsequent reading. As teachers, we need to find ways to weave prior knowledge into our students' reading of nonfiction throughout the process of engaging them with texts.

## Why Knowledge Counts More Than Skill



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Prior knowledge affects comprehension—in many cases, far more than generic "reading skills" do. To see what I mean, consider this short passage about a baseball game:

Rick Porcello has been the anchor of the Red Sox rotation all year, and tonight, he showed why. He was perfect through the first 11 outs. Then he hit Manny Machado. Porcello shouted "I'm not trying to hit you, Bro," to remind the slugger that it would make no sense to have plunked him with a perfect game still on the table, but Machado took apparent issue. Then, after he scored on Mark Trumbo's double, he stared down Porcello. So Porcello proceeded to strike Machado out on three pitches in the sixth, and then fanned him on four in the ninth.

If you're a baseball fan, you probably gleaned a great deal of information from this passage. For example, when the article describes Rick Porcello as the "anchor of the Red Sox rotation," your knowledge of the baseball term *rotation* enabled you to understand that he was an excellent starting pitcher (rather than a relief pitcher or a closer). When it says "he was perfect through 11 outs," you knew this didn't mean that he was flawless in the generic sense, but that he had not allowed a base runner until he faced the third batter, Machado, in the fourth inning.

Your prior knowledge also enabled you to understand the central conflict in the passage: When Porcello "hit" Machado, it was with a pitched ball, which is painful and can be either an accident or a deliberate provocation. Because you knew that being hit by a pitch sends a batter to first base, you weren't surprised to read that Machado later scored. You could envision him pausing after crossing home plate and staring at Porcello, thus responding to the pitcher's perceived provocation with one of his own. In other words, you understood the plot; you sensed the spiraling tension between the two players. And you knew how that tension was resolved—later in the game, Porcello made a statement when he struck Machado out twice ("fanned" him).

As you read the article and made these inferences and a dozen others, you understood the text far better than a reader who knew nothing about baseball would have. Your understanding was not the result of some generic "inferencing skill"; it was the result of your prior knowledge. If I gave this passage to a group of literacy experts in the United Kingdom and to some of my daughter's 3rd grade classmates here in the United States, my daughter's classmates would understand it far better.

But you didn't just understand what you read better than a reader with no prior baseball knowledge would have, *you also learned more new things*. The gap between your comprehension and a less baseball-savvy reader's would likely be bigger next time around because your knowledge base grew faster. You were learning things that a reader who was just trying to connect the basic dots would not: Porcello is having a great year; Machado has a fiery temperament; big leaguers talk casually during the game, Bro. The next time you and your counterpart read a passage, the gap in understanding would be even bigger.

We call this concept—the rate at which readers are expanding their background knowledge as a result of what they are reading—*absorption rate*. Although this is an exaggerated example (baseball has an unusually distinctive vocabulary and knowledge base), some version of it occurs every time a reader encounters a text.

How can teachers ensure a high absorption rate that feeds students' ability to think deeply? How can they teach nonfiction successfully and engagingly so that students are confident reading it, not just in the classroom but also in their personal endeavors? The first step may be to reconsider how and when we teach nonfiction.

## Enrich Understanding with Embedded Nonfiction

Many language arts teachers approach nonfiction structurally. They perceive it as a genre and strive to help their students develop an overarching structural knowledge of that genre. They reason that, if students understand how information is presented, they will understand what they read.

Such teaching often looks like this: An article is chosen and introduced and analyzed formalistically. How is the information organized? How do text features like subheads and captions function? Where and how is evidence cited? In fact, many English teachers make a unit out of such lessons. I did this myself as a teacher. In retrospect, I must admit that the results were often brutal.

That's because this approach puts students in situations where they're disconnected from the texts they read. If students are reading a text because it's a fine example of how subheads work, they're unlikely to have any emotional or intellectual connection to it.

For an alternative approach, consider what my colleague Colleen Driggs did recently. She was reading the novel *Lily's Crossing* by Patricia Reilly Giff (Delacorte, 2001) with her 5th graders. The book is set in New York during World War II and tells the story of Lily, whose father is away fighting in Europe. One detail in the book is the presence of rationing: staples like butter and oil are in short supply; people stand in lines and go without; rationed items can only be purchased on specific days.

Rationing is something most 5th graders today know little about. So Colleen brought in a nonfiction article on rationing—how it worked, what it was like, how people reacted. About four chapters into *Lily's Crossing*, Colleen had her students read and discuss the article. She focused on the article's content, not its use of subheads or other structural elements. Here's what happened:

- The students were engaged and interested in an otherwise dry topic. Because they knew and identified with a fictional character who was experiencing rationing, they had some context and emotional connection.
- They picked up all kinds of new details and questions—what was "fuel oil" anyway, and why was it important in the 1940s?
- Because they now understood more about the context of the novel, their absorption of it also increased—doubly so when Colleen replaced stock questions, such as "What is motivating Lily in this scene?" with knowledge-based questions, such as "How is Lily's experience with rationing like and unlike the experiences described in the article?"

Through this strategy, Colleen also created an implicit narrative for her students about why someone would read nonfiction—people use it to find out about things that interest them. As adults, we would never read a nonfiction article because we felt it was an outstanding example of, say, presenting events in chronological order. We're much more likely to read an article because something else we were reading on a related topic piqued our interest.

Based on this experience, Colleen included nonfiction articles—more than half a dozen of them—throughout her class's study of *Lily's Crossing*. Students read articles about victory gardens and blackout curtains. They read about spies and about the United States' decision to enter the war. They read about the Luftwaffe bombing of London so they could understand why people were so fearful of air raids. The students—with growing context and knowledge—read energetically and enthusiastically and learned more and more from the articles.

But here's the really interesting part. They also learned more and more from the book itself, which was transformed from a novel pleasantly set in a unique historical period into a deep study of that period with a rich and useful context. They started to understand the book's allusions and references.

The strategy Colleen used is called *embedded nonfiction*. The idea is to connect and combine nonfiction with other texts (both fiction and nonfiction) to ensure richer engagement and better leveraging of knowledge. It results in students reading more nonfiction with more learning—and also getting more knowledge and understanding out of the fiction they read.

## Ask Knowledge-Based Questions

Another way to enrich students' learning from nonfiction involves shifting the types of questions we ask. One of the tenets of U.S. education is the belief in teaching formal reading skills—the idea that students learn to read in large part by learning to predict, make inferences, interpret character motivation, summarize, and so on. Many teachers believe that these skills are fungible—that students who learn them in one context will be able to apply them in other contexts, and will thus develop the capacity to read anything.

However, there's lots of evidence to challenge this assumption. Consider one of your weak readers. Let's call him John. Most likely, John has no problem making inferences when he watches a movie. The problem is not that John lacks skill in making inferences, but rather that he can't do it when he is reading texts—or when he is reading certain texts. Once you've ensured that he can read technically—that he can decode and read with enough fluency to have some cognitive capacity left over to reflect—it might be better to build his knowledge rather than practicing inferences with him. Or, if you're not sure, you can hedge your bets and do both, asking some skill-based questions and some knowledge-based questions.

A friend told me about her visit to a high-performing school—one of the highest in the state she lives in despite serving a population of mostly poor kids. The school is more committed to developing background knowledge than most schools. For example, kindergarteners might be sent home with a book about ants or frogs they'd read in class. Instead of asking them to read it to their parents for homework and practice their decoding, as many schools would, this school would ask them to explain to their parents everything they'd learned about ants or frogs from the book. This practice emphasized knowledge development (retelling the facts) over skill development (practicing decoding).

I'd been thinking about what this might look like inside reading classrooms, and I soon had an opportunity to think it through myself. My daughter was reading a novel set during the U.S. Civil War. The protagonist, Emma, sneaks behind Confederate lines as a spy. As a teacher, I'd been trained to ask questions like this:

- What motivates Emma to aid the Confederate soldier?
- What does she learn about herself?
- Who else in the book feels a strong sense of duty to someone else?

Indeed, those questions could have made for an interesting and worthwhile discussion. But what if I also wanted to address the knowledge deficit, to try to maximize my daughter's absorption rate of background knowledge as she read? In that case, I might have thought about some different questions:

- What does Emma tell us about what soldiers died of during the Civil War? Is it surprising in any way? (Emma notes that far more soldiers died from disease than from battle, and that typhoid fever was a leading killer. Most people think more about dramatic combat deaths, but disease killed more soldiers in almost every war until World War II.)
- Is there anything in the text that tells us why so many soldiers might have died from disease during the Civil War? (Alan, the soldier, recalls how when he started to get weak and could not keep up with his regiment, he was left behind with no food or shelter. Students might also note that Emma knows there's nothing she can do but comfort Alan—there's no medical cure, as we might hope there would be today.)

These fact-based questions are actually surprisingly rigorous, and like the more common questions, they could have led to a fascinating discussion. And the knowledge students built would have been applicable to more than just the Civil War—it could easily have been extrapolated and applied to other questions and time periods. Think of how powerful the following facts are in understanding events throughout history: Some deaths get more attention than others because they are dramatic; until recently, soldiers died mostly of sickness; and nursing used to mean comforting someone in death as much as restoring them to health.

Many of us are trained to think of such questions as second-rate or "not our job"—I know I would have for most of my teaching career—and I'm not suggesting that teachers ask *only* fact-based questions. But if we don't ask any such questions, we may be tacitly socializing students to believe that facts are irrelevant. By asking some fact-based questions, we can chip away at the knowledge deficit and teach our students how to unlock knowledge from what they read.

## Put Writing Before Discussion

Another challenge in building students' knowledge is that we sometimes remain in the dark about how much students understand about what they read, so we let gaps in knowledge and understanding persist. With that in mind, I offer a final idea to help students build knowledge and master nonfiction texts. But first a short story.

When people ask me whether I've read Shakespeare's *The Winter's Tale*, I never know what to say. I was assigned it in a class, where I discussed it and then wrote a paper on which I did quite well. But I never actually read the play. I was a college sophomore at the time, and busy with things that seemed more pressing than Shakespeare. Still, I went to class on the day we were slated to discuss the play, and it soon became clear that it was about jealousy. There were two kings, Leontes and Polixenes, who were friends until suddenly Leontes became convinced that Polixenes had an affair with his wife. We discussed the possible sources of Leontes's sudden jealous rage and the ramifications of his unchecked suspicion. As I gathered the basics of the story, I was able to participate in our discussion, dropping in an occasional worldly wise chestnut about the nature of jealousy from the back row.

That night, I reflected on what my classmates had said and, harvesting lines from the first scene or two, wrote a paper about the hidden seeds of Leontes's rage. I aced the paper, and for years I thought that was hilarious. Of course, it isn't—not only because I missed out on *The Winter's Tale*, but also because my story is the archetype of a dynamic that happens in our classes over and over. The fact that my professor thought I had read and understood the play made her, I now realize, typical of many teachers.

Students routinely appear to understand what they read far more than they actually do—simply because of the way we structure our instruction. Typically, we read a text, then discuss it, and then ask students to write about it. The writing (a paper, a test, or some other format) is usually the means of assessment, but it actually conflates two things: how much students understood of what they read, and how much they were able to augment and supplement their understanding during subsequent activities. Thus, we often don't know, and surely overestimate, whether our students can understand the text on their own. This obviously limits our ability to support their knowledge development.

Sometimes the simplest fixes can be the most powerful, though, and here's a simple suggestion: Instead of read-discuss-write, try read-write-discuss. This would let you circulate and observe what students were able to glean independently from the text. Or even better, why not read-write-discuss-revise? This would give students a chance to show what they know both from their initial reading and from the discussion; and they could also reflect on how their initial understanding has progressed.

## Knowledge Is Crucial

The ability to build knowledge by reading and to learn from texts is a crucial driver of student success. It is critical to fostering ultimate student autonomy. It is crucial to equity because many students' lack of background knowledge causes them to fall further and further behind.

Many teachers understand the importance of knowledge in reading, yet they've struggled to identify specific teaching methods to help students grow their knowledge and access knowledge-building nonfiction texts. To

address that challenge, try the three strategies described here: embedded nonfiction, text-based questions, and the use of writing early in the lesson cycle.

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