

# The Connections Between Writing, Knowledge Acquisition, and Reading Comprehension

by Judith C. Hochman and Natalie Wexler

Monica was diagnosed with dyslexia as a child. After repeating first grade, she received over 100 hours of tutoring. But by fourth grade she had fallen behind again. By the time she arrived in high school, she had low expectations. “I didn’t think I was going to go to college because I was special ed,” she told an interviewer, “and special ed kids don’t go to college” (The Writing Revolution, Inc., 2017; Tyre, 2012). Just three years later, however, Monica had passed her New York Regents exams in English and American history—scoring an impressive 91 on the latter. Eventually, she not only attended college but graduated with a degree in sociology.

What resulted in improvements for Monica—and many other struggling students at her school, whether diagnosed with dyslexia or not—was not a reading program or tutoring. It was explicit classroom instruction in a series of strategies for writing.

Writing is generally seen as a skill—and one that many U.S. students have yet to master. Only about 25% score proficient or above on the National Assessment of Educational Progress, and that proportion is much lower for certain subgroups. Eighth-grade students with learning disabilities, for example, have a proficiency rate of only 5 percent (National Assessment of Educational Progress in Writing, 2011).

## The Interplay of Writing with Knowledge

To be sure, writing *is* a skill, or a set of skills, involving everything from spelling and handwriting (or keyboarding) to the organization of ideas. But it is also intimately bound up with content knowledge. You cannot write about what you do not know, and the more you know about a topic the better your writing is likely to be (ETS, 2002). Writing also reveals gaps and misconceptions in the writer’s grasp of a topic, requires critical thinking, and generally deepens and strengthens the knowledge a writer begins with (Graham & Perin, 2007). Unfortunately, most writing instruction in the U.S. overlooks this symbiotic relationship between writing and knowledge.

Traditionally, writing instruction has consisted of having students memorize parts of speech and rules of grammar. Following the rules of grammar is critical to good writing, yet as studies going back a century have determined, simply having students memorize those rules has no positive impact on students’ writing—and sometimes has a negative impact. (Graham & Perin, 2007) Over the past several decades, a different approach has taken hold in U.S. schools, especially at the elementary level. Often referred to as “writers’ workshop,” it avoids focusing on rules of grammar and puts a premium on encouraging children to find their “voice” and write with fluency. The assumption is that children will simply pick up the conventions of written language if they read and write enough. But low proficiency rates on national writing tests indicate that for many students, that never happens.

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There are, in addition, two fundamental flaws in the writers’ workshop approach as it relates to knowledge. First, it has focused primarily on having students write narratives about their personal experience rather than anything that relates to the content of the curriculum. As with reading, writing in elementary schools has been walled off from the content areas and confined to a largely skills-focused “literacy block.” This artificial disjunction between writing and the rest of the curriculum represents a huge wasted opportunity to build children’s knowledge of the world. It also fails to prepare them for the kind of expository and analytical writing they will be expected to do in high school and beyond.

Second, the assumption has been that students should write at length beginning in the earliest grades. Writers’ workshop advocates often urge children to “flash draft,” writing at a furious pace with little or no advance planning (Calkins, n.d.). When encouraged to produce pages of prose, inexperienced writers can easily become so overwhelmed that they lack the cognitive capacity either to produce coherent writing or to deepen their knowledge.

## Why Writing Is Such a Challenging Task

Although there is ample research on the cognitive processes involved in reading, less attention has been focused on writing. Still, it is clear that writing, being expressive rather than receptive, is the more challenging task. That is particularly true when writing is “knowledge-transforming” rather than “knowledge-telling”—that is, when the writer is not merely putting down whatever thoughts occur to her but is engaged in a recursive process of developing and expressing ideas (Bereiter & Scardamalia, 1987; ETS, 2002). Even when asked to produce a sentence, inexperienced writers may be juggling things like letter formation, spelling, word choice, and sentence structure—in addition to organizing and expressing their thoughts on the content they are trying to write about (ETS, 2002).

When students are asked to write at length, they confront additional daunting challenges, such as adhering to a topic, creating smooth transitions, and avoiding repetition, along with ensuring that the overall organization of a piece is coherent.

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All of these factors impose heavy burdens on executive functions—the cognitive processes that enable us to perform a series of actions—and on working memory, which has a limited capacity both in terms of the number of items it can hold and the length of time those items can be retained (Bereiter & Scardamalia, 1987). Given these demands, it is all too easy for students to lose their train of thought. No wonder many experience stress when asked to write—and stress itself can interfere with concentration and the ability to organize one’s ideas (Luethi, Meier, & Sandi, 2009; Shields, Sazma, & Yonelinas, 2016).

These problems are only compounded at upper grade levels, where it’s assumed that students have already acquired basic writing skills. Given the flaws in the writers’ workshop approach at the elementary level, that is not the case for many students—including Monica. In ninth grade, when asked to write an essay about Alexander the Great, she was able to produce only six simple sentences, one of which made no sense (Tyre, 2012). Like most elementary teachers, many high school teachers have received little or no training in teaching the fundamentals of writing (Goldstein, 2017). Even teacher-prep programs for high school English teachers may not cover writing instruction, and those that do seldom focus on basics like constructing sentences. In any event, high school teachers are likely to feel that teaching basic writing skills is not part of their job. They may not assign much writing or simply overlook the myriad errors and deficiencies that confront them. The result is that many students graduate without being able to express themselves clearly in writing. And because of the cognitive demands imposed by writing at length, they have also been deprived of opportunities to acquire the deep knowledge and analytical abilities that writing can foster.

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Many people assume, as writers’ workshop proponents do, that students will absorb the conventions of written language intuitively from their reading. But even students who are proficient readers often write the way they speak—in fragments, with unclear references, and using sentences that are either excessively simple or run on far too long (Graham & Perin, 2007). For many students, including many native English speakers, written English is essentially a second language, with syntax and vocabulary that need to be taught explicitly. As Lisa Delpit has observed, the writers’ workshop approach can “create situations in which students ultimately find themselves held accountable for knowing a set of rules about which no

one has ever directly informed them” (Delpit, 2006). Or as Monica told an interviewer, “There are phrases—*specifically, for instance, for example*—that help you add detail to a paragraph. Who could have known that, unless someone taught them?” (Tyre, 2012).

The key to unlocking writing’s potential to boost knowledge is not just to *teach* students about rules and conventions. Rather, the writing process needs to be broken down into manageable chunks that students then practice, with guidance and prompt feedback from a teacher, to the point where they become lodged in long-term memory. Just as with reading, the more students can rely on long-term memory, the fewer factors they need to juggle in working memory, and the better they will be able to absorb and analyze new information.

### Begin with the Sentence

The method used to help Monica—and many other struggling students—begins with the sentence. Sentences are the essential building blocks of all writing, and the challenges they pose are frequently underestimated. In the traditional approach, students may simply be taught the abstract definition of a sentence as a “complete thought, containing a subject and a predicate.” Writer’s workshop advocates assume students will just pick up the ability to construct coherent sentences without explicit instruction. Researchers, too, have generally overlooked the sentence. In a meta-analysis of writing interventions, only one of the studies reviewed focused on a sentence-level approach: having students combine two or more short sentences into one longer one, using techniques such as conjunctions and embedded adverbial and adjectival clauses (Graham & Perin, 2007). For example, students could be given these three short sentences:

Mohenjo-Daro and Harappa were twin cities.

Mohenjo-Daro and Harappa had urban planning.

The cities had a system of plumbing.

They might combine them to create a sentence such as:

Mohenjo-Daro and Harappa were twin cities that had urban planning and a system of plumbing.

The study found that sentence-combining has a positive effect, and we have seen that many other kinds of sentence-level activities also have significant benefits for struggling writers.

For example, students often need to be explicitly taught how to use conjunctions—even simple ones like *because* and *but*. They are even less likely to know how to use conjunctions that frequently appear in written but not spoken language, such as *although* and *despite*. Teachers can accustom their students to using such constructions by giving them sentence stems like these:

Frederick Douglass advocated voting rights for black men *because* \_\_\_\_\_.

Frederick Douglass advocated voting rights for black men, but \_\_\_\_\_.

Although Frederick Douglass advocated voting rights for black men, \_\_\_\_\_.

In providing phrases to finish these statements, students are learning—in an experiential way—the meanings of these conjunctions. They begin to understand that *because* provides an explanation (e.g., “Frederick Douglass advocated voting rights for black men because he didn’t think they could be truly free without them”) and that *but* and *although* signal contrasting information (e.g., “Although Frederick Douglass advocated voting rights for black men, he was criticized for not advocating women’s suffrage”). After repeatedly engaging in activities at the sentence level, students are able to store the strategies they target in long-term memory. In effect, these activities provide students with what psychologists call “deliberate practice,” repeated efforts to perform aspects of a complex task in a logical sequence, with a more experienced practitioner providing prompt and targeted feedback (Ericsson & Pool, 2016).

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When they engage in their own independent writing, students can draw on their knowledge of these strategies with relatively little effort, freeing up capacity in working memory for comprehension and analysis of content. They are also better able to understand the conventions and syntax of written language when they encounter them in their reading, boosting their ability to add to their knowledge independently. “Before, I could read, sure,” Monica told an interviewer. “But it was like a sea of words. The more writing instruction I got, the more I understood which words were important” (Tyre, 2012).

### Gaining Content Knowledge

But sentence-level activities lodge more than knowledge of writing conventions in long-term memory. When embedded in the content of the curriculum, they also help cement knowledge of that *content*. For example, completing the sentence stems above about Frederick Douglass requires students to recall information they read or heard recently, but not so recently that the response is automatic. As cognitive psychologists have found, that kind of activity—known as “retrieval practice” or “the testing effect”—is a powerful boost to acquiring lasting knowledge (Roediger & Karpicke, 2006). The cognitive benefits of writing about content are also similar to those derived from explaining a topic to another person, or “the protégé effect” (Boser, 2017). When students are still so young or inexperienced as writers that it is challenging for them to engage in sentence-level activities independently, they can

derive almost as much benefit from doing them collectively and orally under the guidance of a teacher.

To maximize the chances that students will use the strategies in their independent writing, teachers should incorporate sentence-level activities into instruction at all grade levels and across the curriculum—not just in English class. The knowledge-building benefits of the activities are often greatest in subjects like science and history. For example, a science teacher might provide students with the stem, “Aerobic respiration is similar to anaerobic respiration” and ask them to complete it in three ways, using the conjunctions *because*, *but*, and *so*. Once students have become familiar with various ways to construct sentences—such as beginning with a phrase that tells the reader *when* something happened—a history or social studies teacher could give students a brief kernel sentence such as “Pyramids were built.” The teacher could then ask students to draw on both their knowledge of the writing strategies they’ve been taught and their knowledge of the subject matter to expand the sentence into something like, “In ancient times, pyramids were built in Egypt to protect the body of the deceased pharaoh.”

Although teachers at upper grade levels may feel that constructing sentences is too low-level an activity for their students, the rigor depends on the content in which the sentences are embedded. At the college level, a philosophy professor could ask students to complete the following stem: “Immanuel Kant believed that space and time are subjective forms of human sensibility, but \_\_\_\_\_.”

These activities also foster students’ ability to think critically and analytically. A math teacher might give students a multi-step equation by a fictional student and the kernel sentence “She made a mistake,” asking them to analyze and explain in writing where the student went wrong. Even a simple conjunction like *because* requires students to review information to determine a causal relationship among a mass of details. Change-of-direction conjunctions like *but* and *although* involve the more challenging task of identifying countervailing factors. These activities lay essential groundwork for the demands of analytical, persuasive, and argumentative writing.

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### Preparing for Lengthier Writing

Before students embark on lengthier writing—whether a single paragraph or a multiple-paragraph essay—they need to be taught how to create a specific, linear outline, with key ideas supported by related details. Numerous studies have shown that making an outline tends to lead to better-quality writing—and that children, especially those with learning disabilities, generally engage in little planning before they

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write (ETS, 2002). Simply plunging into a piece of writing without advance planning is of dubious value for inexperienced writers even when composing personal narratives. When the practice is applied to the more challenging genres of expository and persuasive or argumentative writing—and to content beyond the writer’s own experience—it imposes a crippling cognitive load.

When students *are* asked to plan before writing, they’re often encouraged to use nonlinear concept and “bubble map” diagrams (see Figure 1). Although these devices can help with brainstorming ideas, the guidance they provide is so vague that the working memories of inexperienced writers will still be overburdened. A linear outline can specify the order in which students should present their ideas and prevent them from repeating points and wandering off topic (see Figure 2). And as with sentence-level activities, writers who are not yet ready to plan paragraphs and compositions independently can still reap many of the same benefits by creating outlines orally and collectively, with a teacher’s guidance.

Planning is one of the two most crucial phases of writing; the other is revising. Although the cognitive load is lighter during this phase, students will need to rely on their knowledge of sentence-level strategies in order to make their writing smooth and coherent. If they see a need to vary their sentence structure, they can draw on their knowledge of subordinate introductory clauses, such as those beginning with “although,” or of appositives (a phrase describing a noun, such as “George

Washington, the first President of the United States...”). If they need to connect their thoughts or introduce an example, they will have a storehouse of transitional and connective words and phrases at their fingertips.

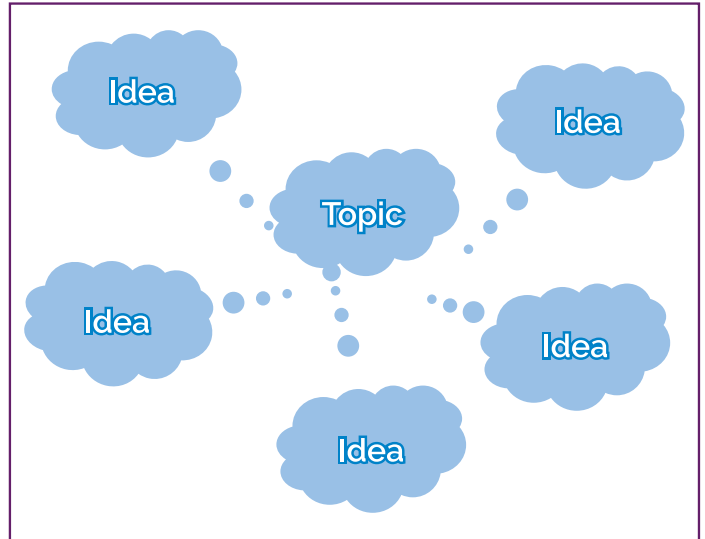
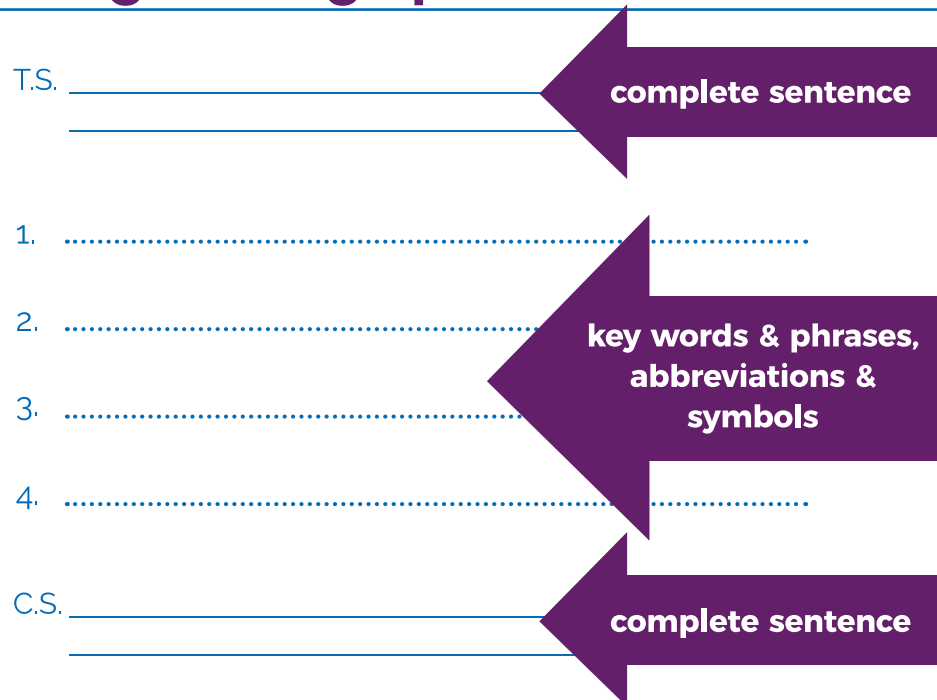


Figure 1. A Bubble Map

## The Single-Paragraph Outline (SPO)



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Figure 2. A Linear Outline

## An Emphasis on Quality, Not Quantity

The adoption of the Common Core literacy standards in many states has only intensified the cognitive challenges that writing poses. In an effort to prepare students for the demands they will face in high school and beyond, the standards call for less narrative and more expository and persuasive writing, even in lower grades. Unfortunately, however, the Common Core adopts the writers' workshop ethos of emphasizing quantity, specifying that students should produce a minimum of one typed page per sitting in fourth grade, two pages in fifth, three in sixth, and so on. If students haven't first learned to compose coherent, complex sentences and to plan before writing, these length expectations will be counterproductive. Teachers will encourage students to engage in tasks that impose such heavy cognitive loads that they will neither learn to write nor acquire the deeper knowledge that writing can lead to.

The challenge is daunting, but there are signs of progress. An increasing number of teachers are being trained in a method of writing instruction—the method Monica was exposed to—that carefully modulates cognitive load. Although the method has not yet been evaluated in a peer-reviewed study, data collected on schools that have implemented it in partnership with the organization that disseminates it show that most have achieved higher-than-average growth on state assessments and increased graduation rates at the high school level. Ideally, children will be introduced to this method in the early elementary grades, so that by the time they reach middle or high school they have become familiar with various sentence-level strategies and know how to plan and revise lengthier writing. If introduced at higher grade levels and implemented across the curriculum, the method is also capable of dramatically increasing students' writing ability while expanding and deepening their knowledge and fostering their critical thinking skills.

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When embedded in the content of the curriculum and begun at the sentence level, explicit writing instruction is potentially the most powerful lever we have for building and deepening knowledge. It is one of the few interventions that can compensate for crippling gaps in background knowledge, even for high school students. And when begun at earlier grade levels, it can help prevent gaps in knowledge—and skills—from arising in the first place.

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