



Excerpt from Chapter 8 — The Knowledge Building Dimension: Surfacing and Building Schema in the Disciplines from **Reading for Understanding: How Reading Apprenticeship Improves Disciplinary Learning in Secondary and College Classrooms, 2nd Edition**

Ruth Schoenbach, Cynthia Greenleaf, and Lynn Murphy

ISBN: 978-0-470-60831-9

- 🔗 [Jump to document](#)
- 🔗 [Purchase the full publication](#)
- 🔗 [Browse the WestEd bookstore](#)
- 🔗 [Visit WestEd.org](#)
- 🔗 [Preview on Google Books](#)

RECOMMENDED CITATION:

Schoenbach, R., Greenleaf, C., & Murphy, L. (2012). Engaged academic literacy for all. In *Reading for understanding: How Reading Apprenticeship improves disciplinary learning in secondary and college classrooms, 2nd edition* (pp. 1-6). San Francisco: Jossey-Bass. Retrieved from: http://www.wested.org/online_pubs/read-12-01-sample3.pdf

About WestEd

WestEd, a national nonpartisan, nonprofit research, development, and service agency, works with education and other communities to promote excellence, achieve equity, and improve learning for children, youth, and adults. WestEd has 16 offices nationwide, from Washington and Boston to Arizona and California. Its corporate headquarters are in San Francisco.

Areas of Work

- Assessment, Standards, & Accountability
- Culture, Diversity, & Equity
- Early Childhood & Early Intervention
- English Learners
- Evaluation
- Healthy Kids, Schools, & Communities
- Leadership & Teacher Professional Development
- Literacy
- Mathematics
- Science
- Policy
- School & District Improvement
- Special Education
- Technology & Information Services

Limited Electronic Distribution Rights

This document is protected by copyright law as indicated in a notice appearing later in this work. This PDF is provided for non-commercial use only. Permission is required from Jossey-Bass to reproduce or reuse in any other form for commercial use. For information on reprint and linking permissions, please see [Wiley Permissions](#).

Excerpted with permission of the publisher, Jossey-Bass, a Wiley imprint. From *Reading for Understanding: How Reading Apprenticeship Improves Disciplinary Learning in Secondary and College Classrooms*, Second Edition, by Ruth Schoenbach, Cynthia Greenleaf, Lynn Murphy. Copyright ©2012 by WestEd.

The Knowledge-Building Dimension

Surfacing and Building Schema in the Disciplines

I have a big goal to read all the Jackie Collins books before I'm 20, so I read a lot of that. . . . *Othello* was kind of hard. I used like a little bit of schema because last year we read *Romeo and Juliet*, and this year we read *Othello*, and they're both tragedies. Usually they're going to follow the basic outline of what Shakespeare writes as a tragedy. Like once you already read an author's work, you kind of know how that author likes to write.

—Shelli, grade 10 student

KNOWLEDGE—whether about the world of ideas in a text or about the ways particular texts work—both supports reading comprehension and develops as a result of reading. To access the ideas and information in different types of texts, readers call on overlapping types of knowledge. We have chosen to categorize them in this chapter as knowledge about content and the world, knowledge about texts, knowledge about language, and knowledge about disciplinary discourse and practices.

Tenth-grader Shelli, quoted at the opening, has developed some knowledge of different kinds of texts that she applies to reading fiction. She has come to understand (and enjoy) the potboiler, a genre favored by Jackie Collins. But Shelli has also developed clues about how to read Shakespearean tragedies. As she says, her schema from reading *Romeo and Juliet* gave her a way to approach *Othello*: “You kind of know how that author likes to write.”

In this chapter, we look at the ways in which teachers can support students in accessing and building on their prior knowledge, or schema, generally and in relation to specific disciplines. Yet even in a chapter focused on building knowledge, knowledge is not the end in and of itself. To help students build

knowledge, the overarching goal remains that of increasing their confidence and competence as independent, critical readers and writers of academic texts. We are still talking about how to promote student agency.

Thinking Metacognitively About Schema

The concept of schema emerges as we work with text. One of the things that keeps coming up is what individuals know—and bring to the text. I use the word “schema” to name it. Soon the function of schema in students’ reading is obvious to them. Usually there is a nice moment when we notice together that the more schema you have about something, the easier it is to read about that topic, and the easier it is to learn more about it. The feeling in the room is something like, “How cool is that?!”

—Gayle Cribb, high school history teacher

Schema is a concept that students should understand and own. They can think of schema as a personal library of knowledge—based on a lifetime of reading and experience—that they already have and can draw on, add to daily, and revise if they need to as they learn more. This information is organized, filed for future retrieval. When students encounter new information or experiences, their minds automatically try to figure out how the new information fits with schema they already have: What do I know that is like this? What pattern am I seeing? Where do I file this?

Students may find, for example, that they have lots of schema for music, filed in different ways (types, artists, instruments, last night listening to the car radio, Jerome’s favorite songs), so even if they hear a Bach fugue for the first time, they recognize patterns: it’s music, not sandpaper. They no doubt have considerably less (or even incorrect) schema for Daniel Webster (his cousin Noah, for example, was the lexicographer).

High school reading specialist Linda Brown found that the concept of schema makes it easier for her students to understand why they may have trouble comprehending particular texts:

On a metacognitive level, not as an excuse, the concept of schema has allowed students to understand a reason for the difficulties some experience.

For teachers, awareness of the schema that students have and may need to develop is especially important if they anticipate a mismatch between students’ schema and the texts they are expected to understand. When giving reading assignments, most teachers take it upon themselves to surface students’ prior knowledge about a topic or genre or author as a jumping-off place. What teachers do less often is help students become metacognitive about schema, showing them how they can activate relevant knowledge they already have from other

CLASSROOM CLOSE-UP 8.1

“Give That Schema a Second”

When Lisa Krebs introduced her tenth graders to *Othello*, she was concerned that they would be quick to dismiss it as too hard or too boring. As she explains, she pushes students to explore their schema as a way to remind them of how much knowledge they already bring to the text if they figure out how to use it:

“I’m trying to get them to be motivated readers by showing them that they do have schema within themselves that will help them understand what’s going on, on the page. I explain that the more you recognize, or the more you can bring in experience to a reading, the more interesting it is to you. And then, hopefully, the more likely you’ll be to want to read it, and to want to really explore the ideas that are in it.

“For example, we did a Talking to the Text on a section from Act 2, where the messenger is telling all of the Venetians in Cyprus that it’s time to party—

they’ve won the battle against the Turks, and also a fellow has recently married.

“Kids understand party, because Harold [the messenger] uses words like ‘festivity’ and he talks about keeping the kitchen open and having access to food and wine. But he also talks about how it’s celebratory because of the nuptials. A lot of kids stopped on that word: ‘Nuptials? What is that? I don’t understand what that is.’

“I helped them see that they do know what that is, they just don’t use that word as nuptials. ‘Think about the term prenuptial,’ I said. ‘You know what a prenuptial agreement is, right?’ And everybody knew that.

“And so just trying to let them in on that they do have a lot of schema there, that they just need to give it a second, to sort of sit on it a minute and not give up.”

reading, discussion, or experience, and then demonstrating for students how to further develop this existing knowledge.

In Classroom Close-Up 8.1, high school English teacher Lisa Krebs describes a simple example of how she engages students in retrieving schema they already have in order to build on it.

Although not all new information presents readily discernible patterns or schema connections, as students learn to think of themselves as capable problem solvers, they consciously engage in the search for these patterns with increasing persistence and success. When they become metacognitive about the background knowledge they have, they are active agents in their own reading growth. They surface and use the schema they have to make connections between prior and new knowledge, they see when to relinquish and revise misleading schema, and they work on developing new schema to make sense of particular texts.

When teachers introduce students to the concept of schema, humor is a particular ally. The schema “collisions” that make humor humorous can immediately draw students into consideration of how their minds organize knowledge. For example, the headline “Red Tape Holds Up Bridge” makes us smile precisely because competing schema for “red tape” allow us to visualize a very unlikely piece of engineering. The headline can be understood in more than one way: it depends on what schema the reader brings or applies.

In the first Reading Apprenticeship classes, teachers Christine Cziko and Lori Hurwitz routinely challenged their academic literacy students with ambiguous headlines (and enlisted students in the search for such examples). By jointly considering the different ways of understanding these headlines, students could see for themselves the role of schema in how easily or accurately readers understand text. (Box 8.1 describes the “Ambiguous Headlines” activity.)

Political cartoons are another way to introduce students to the role of schema in understanding. Readers of the political cartoon in Box 8.2 will understand the cartoonist’s basic message about gender-role reversal, regardless of their

BOX 8.1

Ambiguous Headlines

PURPOSE

Text that can be understood in more than one way highlights for students the role of schema in assigning meaning. Ambiguous headlines provide for an engaging exploration of how our minds relate what we already know to what we read.

PROCEDURE

- Collect a number of newspaper headlines that can be interpreted in more than one way. (For example: “Police Begin Campaign to Run Down Jaywalkers”; “Safety Experts Say School Bus Passengers Should Be Belted”; “Two Sisters Reunited After 18 Years in Checkout Line”; “Kids Make Nutritious Snacks”; “New Vaccine May Contain Rabies”; “Killer Sentenced to Die for Second Time in 10 Years”; “Miners Refuse to Work After Death.”)
- Have students copy down an ambiguous headline and write what they believe to be an improbable but plausible explanation.
- Ask students to write what they believe is the probable meaning of the headline and an explanation of the schema necessary to understand it.

Here are student examples:

“Squad Helps Dog Bite Victim”

Improbable meaning: Bad people help a dog bite people.

Probable intended meaning: A group of people rescue someone who got bitten by a dog.

Schema: You have to know that groups of rescuers are sometimes called squads.

“Eye Drops Off Shelf”

Improbable meaning: The eye falls down off the shelf.

Probable intended meaning: Eye drop medicine gets removed from the store.

Schema: You have to know that headlines sometimes leave out words to save space. Eye Drops Taken Off Shelves would have made more sense. Also you have to know that when something is wrong with it, stuff gets taken out of the store so it doesn’t hurt someone.

BOX 8.2

Cartoon Schema

PURPOSE

The structural features of cartoons—graphic exaggeration, easily discerned clues, and few words—allow students to focus on ways their schema “fill in” to enrich the text and graphics.

PROCEDURE

- Project the political cartoon for all to see and distribute a copy to each student.
- Ask students to Talk to the Text and discuss it with a partner:
 - What do you think the cartoon means?
 - Why did the artist create this cartoon?
 - What evidence or clues did you use?
- Facilitate a class discussion of students’ ideas. What was the role of schema?



“Election Day!” was created by E.W. Gustin in 1909. The original is held by the Library of Congress.

knowledge of women's suffrage. Readers will appreciate the scene even more if they know that this cartoon was published after sixty-plus years of struggle for women's right to vote *and* a full decade before women were actually able to celebrate election day.

Working with low-risk materials like ambiguous headlines, jokes, and cartoons can help students and teachers alike recognize that an individual's schema are undeniably shaped by his or her particular experiences and background. Although class members will share a significant amount of schema by virtue of their common exposure to mass media and living in the same nation, region, state, and municipality, classrooms are nevertheless places where diverse sets of schema come into contact. When individual histories meet over a particular text, varied understandings are bound to emerge. When unexpected interpretations occur, sometimes teachers conclude that students merely lack schema. Routine invitations to think metacognitively about schema can therefore serve teachers as well as students. Both groups benefit from seeing what schema resources students can offer to the conversation and, conversely, how a perfectly understandable misreading of a text may occur due to schema differences. With new understandings of the sources of their students' misreadings, teachers can then help students refine their schema for the task at hand. In such circumstances, teachers discover that far from lacking in schema, students have warehouses of experience and information that can support them in tackling complex text.

For example, technical college instructor Michele Lesmeister was frustrated with a model of adult GED instruction that assigns students' reading material according to Lexile measures. Her students tested at the grade 5 Lexile level, and that's the level at which their textbook was written. However, when Michele introduced Reading Apprenticeship approaches, she decided to also introduce a few texts that were more challenging. She surveyed students about which classroom materials worked best for them and found that the easiest to comprehend were not necessarily preferred:

Interestingly, the exercises selected as best by the students were the type of assignment that compelled them to participate the most, argue the most, and engage the best with the text and in a variety of ways. [To me,] this was like a permission slip to continue to toss out the leveled reading textbook materials and focus more on relevant content—and in a more meaningful way. By the end of the quarter, they were reading grade 9–10 level materials. I found that by applying the conceptual sophistication and intellectual maturity that my students possessed, I could cross such superficial boundaries in my course, leading to a much more engaged classroom.

In Michele's class, texts better matched to students' maturity, combined with collaborative participation routines, gave students a much needed opportunity to build new schema and begin the upward spiral to learning more.

The importance of background experience and knowledge in assisting comprehension is undeniable. Teachers can take advantage of what they know about their students to select texts that will evoke their experiences. This can be empowering for students who may otherwise believe their experiences and knowledge do not matter in the classroom. Yet, when taken to an extreme, starting only with what students know can result in *staying* with what students know. For students with little schema about a topic of study, not already knowing sometimes becomes a trap. In one academic literacy classroom, for example, a student dismissed the need to read a text about the Armenian genocide by asking, “Is anyone in here from Armenia?” She had learned to expect only topics and texts related to her experience and those of her peers. If not supported to stretch beyond what they already know, students may never learn to make connections between the known and the new. They may get stuck exploring what they already know. With metacognitive awareness of their schema, students can instead focus on building and refining what they know—learning to learn in the process.

Surfacing, Building, and Refining Schema

Teacher: I’d like to get some volunteers to respond to today’s preamble: What do you know about organic chemistry or think about it, what are some organic molecules that you know, what do you want to learn about organic chemistry?

Alma: Organic reminds me of like organic stores, they have foods and drinks that are basically just pure, natural.

Teacher: So you’re wondering if the name “organic,” you might get a meaning from that. Okay, Kyle.

Kyle: I know some different organic molecules that’s in us and some plants, like sucrose, glucose. Um, should water be in it?

—Exchange in Will Brown’s honors chemistry class

As part of his introduction of a new chemistry unit, Will Brown invites his students to consider a set of “preamble” questions, first in writing and then with the class, about what they might encounter in their upcoming study of organic chemistry. He is not concerned that they may have misconceptions. He is interested in students’ surfacing any current schema and making preliminary or tentative connections to new information. He knows they will have many opportunities to add to and revise their schema for “organic” as it relates to chemistry, water, and even health food.

Will has an inherent trust of the inquiry process—perhaps because he is a science teacher. He understands that for students to build or revise schema, they must first surface any partial understandings or misconceptions they may have. Once these are on the table, Will’s responsibility is to provide sufficient opportunities for students to evaluate and add to or revise them.

Surfacing Schema

Surfacing students' schema sometimes means tolerating their misconceptions. For teachers who are making a transition to more student-centered, inquiry-based learning, this part of the learning process can be unsettling. When students are developing any area of autonomy and competence, they will make mistakes. In Reading Apprenticeship classrooms, because so much knowledge building is collaborative, in addition to the incorrect "knowledge" that students sometimes have, there will be times when they communicate those errors or misconceptions to others during discussions or group work.

Knowing when, whether, and how to intervene in students' misunderstandings is a skill that teachers develop as a crucial part of encouraging and guiding students toward deeper comprehension of challenging texts. Some knowledge errors don't matter; some are addressed by other students. Many misconceptions get worked out naturally as engaged learning proceeds; others are significant detours or dead ends that need to be handled.

What we want to emphasize is that in Reading Apprenticeship classrooms, where teachers are negotiating long-term student success, the need to ensure that students have immediate, correct information almost never trumps building or maintaining student engagement. Given a choice of whether to simply ignore a misstatement or misconception, to set up a next learning task that explicitly counters it so students develop their own ways of refuting the error, or to step in with correct information and perhaps derail student engagement, teachers learn to make very deliberate calculations.

In Classroom Close-Up 8.2, Will describes a model he tries to follow when addressing student error. The related Box 8.3 maps this approach in a flow chart.

Will's approach, which he also uses when students expect him to give them the answer to a question, means that students come to recognize that the teacher is not the center of the classroom—*they* are. Rita Jensen labels this understanding a "huge turning point" for her middle school classes:

Lots of times students have been "taught" that, if they wait, the teacher will provide whatever answer is required. If they don't answer, she will do it for them. It's a huge turning point when students see that the teacher won't give them the answer. Instead of keeping them dependent, you are teaching them agency.

It's bigger than just not providing the answer. It is about creating a culture of curiosity and collaboration in the class. It can begin with reciprocal modeling, when the teacher says to the class, "I am wondering about this. What do *you* think?" Or when someone ventures an idea, it can get thrown back to the class or to partners or small groups. "Who has another idea?"

When students are on the wrong path, the hard part is redirecting them to other thinking without shutting them down. But if they are in the habit of asking and being asked, “Where is your evidence for that?” or “What makes you say that?” their ideas are not rejected, but neither are they accepted without sufficient evidence. Students feel the difference.

CLASSROOM CLOSE-UP 8.2

Decisions That Keep Students in Control of Their Learning

Will Brown’s high school chemistry students have learned that he will rarely step in and resolve a question, error, or confusion. Will has an internalized “flow chart” that he uses in responding to students, and it is based on split-second assessments of whether the confusion is an opportunity to support student inquiry. (See also Box 8.3.)

“When I notice a student’s error or misconception, my first move is to make sure that the problem is not one of communication. Sometimes what appears to be a misconception is only a miscommunication and can be cleared up with a clarifying question to the student.

“If I really am dealing with an error or misconception, I evaluate how important it is. When the error is insignificant or simply distracting, I may put it to rest with a brief response.

“But when the error or misconception has the potential to interfere with learning goals, I have to ask: What is the urgency of addressing it? Can learning progress if I ignore it?

“If learning goals and learning progress are being derailed, I have three choices: initiate an inquiry, make a mental note to initiate an inquiry later, or clear up the confusion myself.

“My preference is to get students working on clearing up the error or misconception. I make this choice when I know that with some probing on my part, the student or other students in the class have the necessary schema to work it out.

“On the other hand, if I know that the lesson or upcoming lessons address the error or misconception, I’ll let students know to be on the lookout for more information, and we will return to the confusion or question once they have sufficient schema to address it.

“If there is no other option, I will provide the relevant conceptual framework and the ‘correct’ answer. I only do this if there are no other resources I can offer students as a basis for building the knowledge needed, or if I know there is no upcoming opportunity to address the misconception ‘properly,’ through inquiry. My default position is to keep students engaged and in control of their learning.”

One brief example demonstrates Will’s resolve to turn misconceptions over to students. Groups have been asked to come up with a definition for “substance” based on a recent lab:

Jerome: We wrote, “A particular type of constitution.”

Teacher: What does that mean? What does “particular” mean?

Class: A certain one. Specific.

Teacher: If it’s particular, it’s one, right? And what’s “constitution”?

Jerome: Isn’t that like a democracy or something like that?

Teacher: Yeah, we’ve got the Constitution and democracy. Do you think that’s what they’re talking about?

Jerome: No.

Teacher: So maybe that word has different meanings whether you’re talking about science or government. Does anyone else have another definition they’d like to share? Let’s work from that direction.