

6

Maps for the Road to Reading Comprehension

*Bridging Reading Text
Structures to Writing Prompts*

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Topics to be discussed:

- linking reading text structure research to cognitive patterns
- results from first graders' fluency with Thinking Maps®
- multiple Thinking Maps applied to phonics, vocabulary, and reading comprehension

*While I am reading, my mind adds to my Thinking Maps all by itself,
and suddenly I know more than I knew!*

(student in Cristina Smith's
first-grade class, Mt. Airy School, Maryland)

At Mt. Airy Elementary School, in a classroom of first-grade students, on a morning in mid-May, we watched as a third-year teacher read the guiding question for the day: "How will you organize

your thinking about this book?" While this may seem to be an unfocused question, the teacher knew the students could meaningfully respond. The book, *How Leo Learned to Be King*, rested on the chalkboard tray with its colorful picture of a crowned lion on the cover, set there after it had been read aloud the day before. This is an inclusive classroom of students in a modest suburban neighborhood school, a school that had experienced a 15% decline in writing scores over the previous two years and mediocre reading scores as the population swelled beyond the original building and into portables.

This year student performance changed significantly upward and was reflected on state tests as scores generally fell across Maryland. Mt. Airy Elementary School has risen to the highest performing school in our county since providing reading and writing instruction with Thinking Maps. Our data supports the observations we see in classrooms: Thinking Maps significantly impact instruction and improve student performance.

While this is important news, a closer look shows that students have changed how they are understanding texts: They are surfacing dynamic patterns of content from the linear landscape, the wall of text. The range of structures bound within line-by-line text becomes unveiled in the form of mental maps as shown in Figure 6.1a–g. They are changing the form, *transforming* text. Step into a classroom and observe a teacher and you will see how this works.

While observing Ms. Crystal Smith's classroom, I sat down behind the students: As principal and instructional leader, I began clacking away notes on my laptop. Students gathered on the floor near their teacher, just below the blank, open space on the chalkboard that held the guiding question for discussion. The book *How Leo Learned to Be King* had been read aloud the day before, but the students and all of the teachers and administrators across our school had learned about Thinking Maps the year before. These excerpts and the related maps may heighten your understanding of Thinking Maps and still underrepresent the richness of the classroom conversation. Here is how first graders organized their thinking about this book:

Erin: You could use the Circle Map . . . put the topic in the middle and all ideas that you get in your mind from that topic, you write down in the circle . . . Leo . . . details about Leo . . . he was mean and he was nice.

Megan: A Bubble Map about a mouse. You say a word about what the mouse is . . . like furry . . . describing words.

Billy: We could do a Double Bubble. We could compare *How Leo Learned to Be King* and *The Lion and the Mouse*. . . they (both books) both have a lion and a mouse.

Mark: A Tree Map. I am thinking of . . . about Leo . . . what he looks like . . . and, um, I think, and what he is like . . . and what he did.

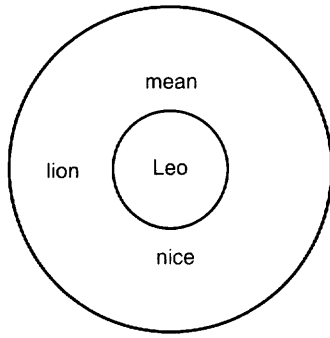


Figure 6.1a Leo Circle Map

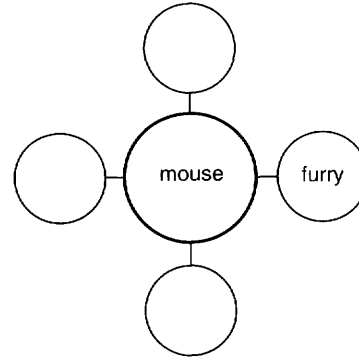


Figure 6.1b Mouse Bubble Map

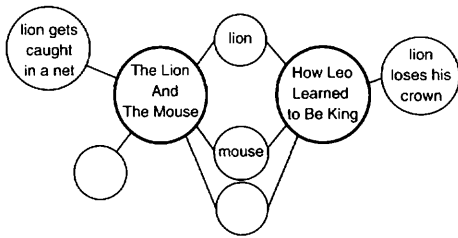


Figure 6.1c Comparing Two Books Using the Double Bubble Map

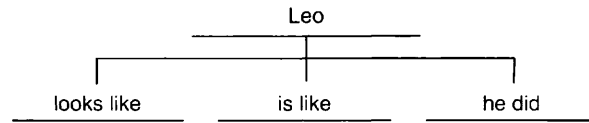


Figure 6.1d Leo Character Analysis Tree Map

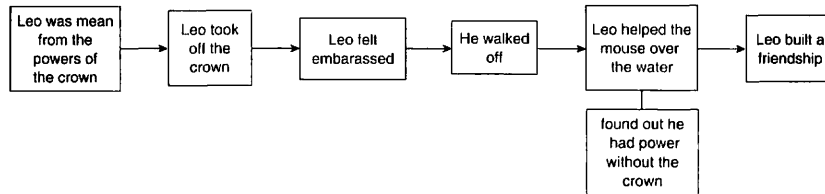


Figure 6.1e Leo Character Development Flow Map

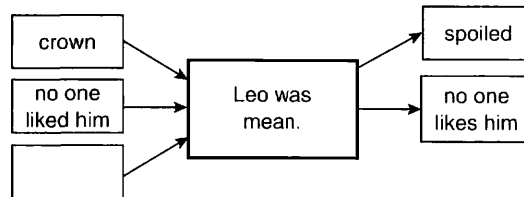


Figure 6.1f Cause of Leo's Being Mean Multi-Flow Map

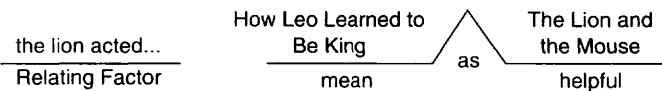


Figure 6.1g Bridging Qualities of Characters Across Text

Thomas: You could organize it with a Bridge Map. In *The Lion and the Mouse*, the lion was mean to the mouse, but in *How Leo Learned to Be King*, the lion was nice to the mouse by helping him get over the river.

Alexis: You could use a Flow Map. First he was mean. Then when they took off the crown he, like, got a little embarrassed. He walked away, he got surprised, because he met a mouse. And at the end he helped the mouse and *they became friends*.

Regan: Multi-Flow . . . what caused him to be mean. The crown made . . . the crown could have caused him to be mean.

Erin: No one liked him. They took away . . . they didn't want him to be their king.

Shawn: We've got a lot of maps, don't we?

Teacher: That makes me think . . .

Shawn: . . . that we are like second graders!

The discussion among Ms. Smith and her students is within reach of any school, replicable, and may refine and even reframe reading and writing instruction, and even offer a new direction for cognitive science research. This teacher had brought students to such a high level of fluency with Thinking Maps that they could begin to identify text patterns on their own. They were able to use fundamental thinking-skills vocabulary (describing, compare, causes, etc.) and respective cognitive maps (Bubble, Double Bubble, Multi-Flow, etc.) and had the metacognitive awareness of being able to explicitly transfer these processes and tools to reading comprehension through identifying text structures. They were then able to return to their seats with blank sheets of paper and, with varying results, choose a Thinking Map and expand their thinking. They later went on to write about the story using the maps they had chosen to organize their ideas.

This sample of classroom activity is a practical and symbolic representation of a new form of literacy and a transformation of how we perceive the interrelationships between thinking patterns and the fundamentals of reading comprehension.

Thinking and Maps

Thinking Maps are the paper of my mind.

(third-grade student, Mt. Airy)

If text on paper is what we produce for linear communication, Thinking Maps are the paper for the mental mapping that goes on in our brain and through our minds. The U.S. Department of Education-sponsored publication, *Put Reading First* (Armbruster, 2002), targets both semantic

maps and graphic organizers as the keys for unlocking text structures and reading comprehension and as bridges to writing prompts. The strength of graphic organizers is the visually scaffolded structure of each form. The weakness is that there is a static nature to many of these templates and an episodic use of the tools by students. There is also a glass ceiling on thinking: Students go from grade to grade, classroom to classroom across schools, often filling in prestructured blanks on a worksheet without much reflection or higher levels of thinking.

As shown above, Thinking Maps provide the dynamic thinking patterns and thus the cognitive link to common text structures. The tools also link these text structures to organization patterns often found in writing prompts, and this is shown in summary form in Figure 6.2. For example, the ability to comprehend a text based on “problem-solution” depends on the student understanding the fundamentals of cause-effect reasoning. Cause-effect reasoning is an essential thinking skill for being able to produce a coherent and well-organized piece of writing in response to a prompt based on prediction (see Chapter 7, Empowering Students).

Reading and Writing: From Phonemic Awareness to Metacognitive Processes

Thinking Maps just happen! They work automatically while I am reading!

(fifth-grade student)

If you accept the premise that we mostly teach and assess using written, spoken, and numeric languages, it is easy to see how we are still caught in the dichotomous debate between phonics and whole language. This debate is nestled within the most heavily researched and publicly financed areas in education, namely, improving literacy. Teachers, researchers, major publishers, and test developers have attempted to synthesize the two sides, yet the practice in the field remains discordant and failed. Our cyclical failures to break through this dichotomy reveal that the problem lies not merely in balancing phonics and whole language or taking a radical swing to one side or the other.

How else does one explain the deficits our nation is experiencing in reading as indicated by National Assessment of Educational Progress (NAEP) scores from 1971 to 2000? NAEP has reported that our at-risk population has improved only slightly despite receiving enormous resources. For our students who are not at risk—those who have the fundamentals of decoding, fluency, and pertinent vocabulary—reading comprehension scores are not much better than they were 25 years ago. It is time to accept the minimal impact on reading comprehension that the present paradigm of research and translations into instruction have made since the 1980s. Why has there been limited change in standardized and performance-assessment scores of reading comprehension despite the enormous effort

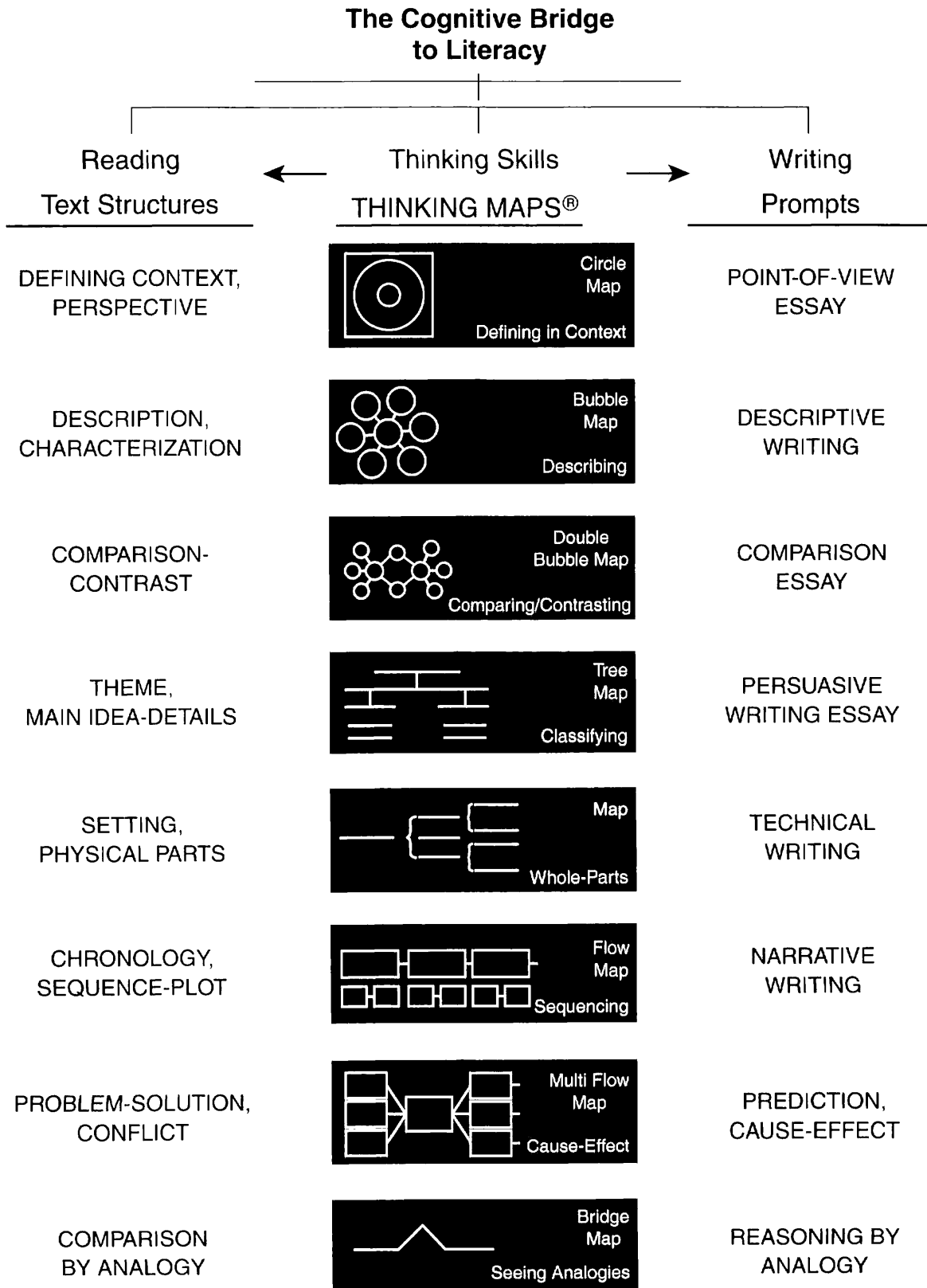


Figure 6.2 Reading, Thinking, Writing Connection

over nearly two decades to overhaul reading comprehension instructional techniques?

Our work with Thinking Maps points to a third way. One missing link is the cognitive *underpinnings, interconnections, and interdependencies* between the processes of phonemic awareness, vocabulary learning, and meaning making. Sasha Borenstein (2000), Director of the Kelter Center for Literacy Development that serves students from the Los Angeles region, states that

. . . the recent research in the area of literacy done by the National Institute of Child Health and Human Development has documented the need for explicit, systematic instruction in “breaking the code,” phonics and word study, as well as in “making meaning” strategies for comprehension. The research supports an active, thoughtful instructional approach rather than a return to repetitive, passive work. (Hyerle, 2000, pp. 108–109)

Reviewing the three areas of the *Put Reading First* (Armbruster, 2002) report distributed widely by the U.S. Department of Education reveals how Thinking Maps provide a cognitive bridge to phonemic awareness, vocabulary instruction, and text comprehension.

Phonemic Awareness

Sasha Borenstein has found that Thinking Maps are a set of tools for helping students to see, break down, and put words back together. Through her work with students who are at risk and falling behind in the Los Angeles area (for a related story from Los Angeles, see Chapter 10, *A First Language for Thinking in a Multilingual School*), she and her staff have found that Thinking Maps work as microcognitive tools for seeing how to work with words:

Thinking Maps are flexible, active tools for exploring literacy. The maps are student-centered, pushing learners to discern patterns and interactions in materials and concepts. Thinking Maps are used in discerning the concepts which organize the expectancies and rules of phonics. Performing the sounds of the past tense, /t/, /d/, and /id/, can lead to the understanding that the sound of this morpheme is based upon the last sound in the root word to which it is affixed. The Brace Map is used by students to identify these **part-whole** relationships. Finding the **similarities and differences** between syllable types using the Double Bubble Maps leads to the understanding that each syllable is defined by its vowel. Creating a Flow Map for **sequencing** the spelling of /ch/, ch or tch, /j/, ge or dge, and /k/ k or ck at the end of a word can lead to the concept that the spelling depends upon what type of vowel is in that word. (Hyerle, 2000, pp. 108–109)

The summary page for phonemic awareness research in *Put Reading First* recommends guiding students to categorize phonemes, see part-whole patterns in words, and put them back together through blending. These are key strategies for developing this one area of early reading development while facilitating language and cognitive skills development.

Vocabulary Instruction

A second area of *Put Reading First* focuses on learning vocabulary. Vocabulary learning is a networking process involving not only direct vocabulary learning through word-learning strategies and repetition but also the indirect acquisition of vocabulary in different contexts. This is because the brain is constantly networking bits of information, and the maps facilitate patterning of related words, which become a context for definitions (see Chapter 2, Linking Brain Research to Best Practices).

Returning to the above reading of *How Leo Learned to Be King*, Thinking Maps create multiple pathways for students and teachers to gather vocabulary from the story into several patterns. These are explicit visual patterns that show a word *in context*. When a student independently voiced that the Circle Map could be used, she stated that you put the topic (Leo) in the center and the details around it. The Circle Map is defined by the visual representation of a circle within a circle and by the thinking skill of defining in context. Students learn to use this tool to look for and gather in the outer circle of the map context words, building vocabulary and meaning around a key topic in the center. Contextualization *requires* that students attempt to give definition to a word not just by what precedes it, but often by reading ahead so that the full context may be brought to bear on the word. All eight Thinking Maps are vocabulary builders: In practical and metaphorical terms, they are the scaffolds for the building process.

Text Comprehension

Correlating with NAEP data is the national report explaining that future implications for reading comprehension include evidence-based assessments. Affirming this concern, Donald Graves (1997) asserts that educators and the public are in a frenzy over how to boost reading comprehension scores.

We must teach students how to synthesize and show their thinking. What we have needed is the physiology of reading comprehension, the actual working parts as a reader interacts with text. But what would the working parts look like? Graves writes that when a reader engages with print, in the past we have had no idea what types of thinking are in process. Over twenty years ago, Lauren Resnick (1983) noted that if we cannot produce a more substantial explanation of the *internal* events that produce improved comprehension, it will be difficult to develop an instructional training approach. She later suggested that research has located a psychological (metacognitive) space, in which educationally powerful effects seem to occur, but it has not yet adequately explained

what happens in that space to produce the effects. A synthesis of these reading researchers (DePinto-Piercy, 1998) confirms the need to change our instructional focus. We must move from the panoramic lens of a wide variety of strategic instructional techniques to include a zoom lens for specific instruction focused directly on what students do during the process of reading.

In the document *Put Reading First* (Armbruster, 2002), proficient readers are described as active and purposeful, and strategies are suggested for guiding students to self-monitoring and metacognition. Central to this section of the report is the focus on graphic organizers and maps that support students in identifying text structures within fictional and non-fictional texts. The report states that these visual tools

- help students focus on text structure as they read
- provide students with tools they can use to examine and visually represent relationships in a text
- help students write well-organized summaries of a text

Dr. Bonnie Armbruster, one of the lead authors of *Put Reading First*, was an early leader in the research on text structures. For example, her work showed that using a problem-solution graphic before reading gave students an advanced organizer of this key structure, and their comprehension improved on those specific texts. Of course, texts are not identified as problem-solution or chronology for students, just as quality responses to open-ended writing prompts are not completed by staying inside the lines of a graphic template (see Chapter 7, *Empowering Students*). Thinking Maps extend this work by having students become fluent in a cognitive and metacognitive toolset for adapting their thinking to varying contexts.

Readers at Risk: A Map for the Roads to Reading Comprehension

When we are out driving in an unfamiliar region, we need a map. The reading comprehension landscape is much more complex as students' eyes hit the page running. Reading instruction traditionally walks students right up to the road of comprehension and says, "Now you're on your own." After being motivated and developing prior knowledge, students had been expected by teachers to cross the road of comprehension alone, greeted on the other side with comprehension questions. Students, especially at-risk children, so often make a run for it, thinking that the faster they get down the page, the better. Then teachers provide "fix-up" or "remedial" strategies when students can't respond to the questions. Lev Vygotsky's (1962) zone of proximal development is the critical region beyond a learner's immediate, autonomous performance, where instructional guidance is crucial. Yet it is exactly in this zone of comprehension where there are limited instructional strategies available.

Rather than dropping students off at the edge of the road, Thinking Maps help them *see* their way through to the end. By guiding them across an unfamiliar text with Thinking Maps, we are providing direct instruction for using reading strategies independently. Providing direct Thinking Map instruction for use *during* reading allows students to cross the reading comprehension road safely. Ultimately, Thinking Map instruction for reading and writing provides students with instruction beyond what- and how-to-use strategies. Thinking Maps require students to understand *why* and *when* to use them. Strategic reading behavior—and writing processes—require that it is the learner who selects an action for a specific purpose. It is the intentional self-selection of and self-regulation of a particular strategy to achieve a specific goal that is the critical component of strategic reading behavior (See Chapter 3, *Leveling The Playing Field for All Students*).

Literacy in a New Language

My Thinking Maps have power. I have all these ideas and nowhere to put them. Thinking Maps let me get them out!

(first-grade student, Mt. Airy School)

The outcomes described above have been attained because of ongoing professional development commitment within the unit of change that makes a difference for individual students over time: the whole school. The whole faculty of the Mt. Airy school were and still are committed to ongoing training. Teachers left the initial training in Thinking Maps with the goal of explicitly training their students to use these tools independently, in cooperative groups, and for the whole class, thus supporting them in internalizing the tools for direct transfer to content learning and process outcomes. The central outcome of the initial training and ongoing follow-up design is represented not only in the high-quality first-grade classroom conversation at Mt. Airy School, but in the quantitative results on the school's state assessments. Following the first year's implementation of Thinking Maps, writing scores realized a 15% increase on the state-mandated assessment, the Maryland State Performance Assessment Program. Later, Mt. Airy Elementary rose from being a school in the middle of testing to becoming the highest performing school of the 21 elementary schools in Carroll County.

In addition, the No Child Left Behind legislation requires that each state test content knowledge and how well students perform. Maryland meets this requirement by using the new 2003 Maryland School Assessments. The cornerstone for Maryland's accountability system is the measure of Annual Yearly Progress (AYP). Again this year, Mt. Airy Elementary is the highest performing school in the county. Mt. Airy's scores are higher than the Maryland state average and higher than the county average, remarkably achieving AYP in all eight subgroups, including special education. The results across our student population show that literacy and cognitive development work together as teachers help

students cross the road to reading comprehension with Thinking Maps as a new language for literacy.

To move beyond the inadequacies of past research and practice and to shift literacy to a new form requires a shift in tools and a mind shift by leaders. Literacy alone is not power in the age of information and technology, multicultural and multilingual communication, and global economies (see Chapter 14, *The Singapore Experience*). A new critical literacy is required, based on research showing that phonemic awareness and metacognitive strategies must develop together with vocabulary development and comprehension strategies across first *and* second languages. Many students, and unfortunately most at-risk students, are given an overwhelming, repetitious panoply of strategies that merely heighten their awareness of words without deepening their comprehension abilities. From our experiences and results, we have found, however, that students are not left behind on the road to reading comprehension when given tools for actively reflecting on how they are thinking and the patterns emerging from text.