

FEATURE ARTICLE

# the library is the place: knowledge and thinking, thinking and knowledge

JUDGING BY WHAT OUR SCHOOLS HOLD AS PRIORITY, WITH CONTENT KNOWLEDGE FAR SUPERSEDING THINKING SKILLS IN TERMS OF WHAT WE TEACH AND ASSESS, IT APPEARS KNOWLEDGE IS VASTLY MORE IMPORTANT THAN THINKING. BUT IS IT? CAN THEY EVEN BE SEPARATED?

If we ask which came first—knowledge or thinking—we land in the chicken-and-egg dilemma. For the two exist in an endless cycle, a feedback loop in which the process of thinking creates the *product* of knowledge, which informs further thinking, which creates new knowledge, ad infinitum.

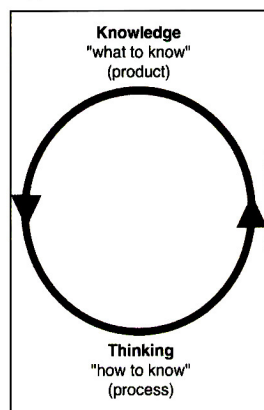
Our tests, in keeping with our instruction, are almost exclusively content-based. Even when schools do try to teach thinking processes, they separate these from the content curriculum. Yet the way our brains function is to use the process in order to understand the product. We must infuse thinking skills into the content curriculum. Think of content as “what to know” and thinking as “how to know.” We must approach the two together and help students understand how they work in tandem. We must teach both *what to know* and *how to know*.

## LIBRARY AS LOCUS OF LEARNING

Because of this content-driven approach, classrooms can be regimented and scheduled. By contrast, the library offers students greater freedom to explore thinking through content. Teacher-librarians are uniquely placed to extend and enrich the learning process launched by teachers from their discrete classrooms.

A library is a learning commons and a place of active research. It is a locus of exploration. There, students move beyond single text provided for classroom use and into a boundless territory of many and varied resources. The library is also the place where many aspects of the students’ schooling intersect: while there working on a product, they engage in and become more aware of the process aspect of their education. For this reason, the library may be

FIGURE 1



Knowledge

the ideal location for launching a new paradigm of teaching both *what to know* and *how to know*.

We take it for granted the importance of training students in methods of research. In other words, we teach them how to go about gathering content knowledge. Librarians willingly give much time to this. What’s missing is the analogous training to help them use—and hone—their thinking skills.

by derek cabrera and laura colosi



JOE SUTLIFF SANDERS

## GRAPHIC NOVELS &lt;

## HISTORICAL SETTINGS

These three recent works demonstrate the joy and pathos of which historical comics are capable.

**Bluesman.** Rob Vollmar and Pablo G. Callejo. NBM/ComicsLit, 2008. \$24.95. 978-1-56163-532-0. Grades 9 and up. This new omnibus edition of *Bluesman* is a moody masterpiece of fiction that is all the more compelling because every word of it *could* be true. Lem is one of the first modern masters of blues, dodging Jim Crow through the Deep South. But he cannot always dodge tragedy, and the deaths of dreams, enemies, and friends will haunt him to the end of his days. His story is told through mixed media that at times achieve the coarseness of woodcut and at others the sharpness of collage, giving the novel a broad visual palette that matches its dramatic variety of emotions.

**Croghan's vengeance.** Chris Schweizer. Oni Press, 2008. \$14.95. 978-1-934964-06-4. Grades 7 and up. Chris Schweizer's rich work is as energetic in its story of a brilliant but conscientious pirate as it is in its bold, clear line. The result is a hilarious story that is clear in spite of its protagonist's charmingly conniving mind.

**The Lindbergh child.** Rick Geary. NBM/ComicsLit, 2008. \$15.95. 978-1-56163-529-0. Grades 7 and up. Rick Geary, the master of historical nonfiction in graphic novels, contributes one of his best efforts in his tale of America's hero and the still-lingering mystery of his kidnapped boy. The tension between Geary's newspaper-style captions and the devastated people he describes produces a story that is simultaneously factual and poignant.

We do not help them think about their thinking. By and large, American students at all grade levels have no idea how to navigate cognition and learning. As teacher-librarians, as teachers, and as parents, we must be explicit with children about how the process of thinking works. Right now, we give content knowledge its due. We must do the same with thinking. Let us undertake this task in the library, where process meets product in a more pronounced way.

## THE PATTERNS OF THINKING METHOD

We have been remiss in teaching thinking skills only because we have not known how. We understand knowledge because it's visible and tangible. That's why, for the most part, we're good at teaching content. But thinking is the invisible, intangible process behind that product. It's the slippery fish that we cannot grasp. How can we teach what we cannot grasp?

To understand how we think, we need only look at the tangible, visible product of thinking—knowledge—and the patterns in how it is structured. We use the visibility of knowledge to understand the invisible process of thinking. In other words, the structure of knowledge holds the patterns for how to create more of it, which is what we do in the process of thinking.

Remarkably simple and accessible, the four patterns lend themselves effortlessly to a practical, extensible method for infusing thinking skills into the curriculum—and for helping students understand their own thinking processes. The four patterns are symmetrical, each made up of two elements that complement each other:

- **Distinctions:** identity and other. Whenever we make a distinction, we assign ideas an identity and in so doing create an invisible other. Making a distinction about who is included in the idea of "us," for example, also creates the distinction of who is excluded and considered "them." We use distinction-making to name and define, to compare and contrast, in order to find similarities and differences, to draw and test boundaries, and to make choices.

- **Systems:** part and whole. Every idea is a whole system made up of parts, while

also serving as a part of a larger system. We organize part-whole relationships by either splitting an idea apart into the smaller ideas that make it up or combining it with other ideas to create a new one; we often use both of these processes simultaneously. Whenever we sort ideas, nest them, or use or create categories, we're organizing systems of parts and wholes.

- **Relationships:** cause and effect. When two ideas relate to each other, they have a mutual effect on each other that changes them both. Recognizing relationships among ideas leads to interdisciplinarity, transfer of learning, analogical thinking, and the ability to form new ideas by combining seemingly disparate pieces of prior knowledge. Relationships are often implicit and require us to recognize them; when we do, we make associations, interactions, and connections explicit.

- **Perspectives:** point and view. Every idea is a perspective comprised of a point and a view. The point is the subject, or the position from which the idea is viewed; the view is the object, or what is viewed. Because the point affects the view and vice versa, we expand what we know about any idea in profound ways when we become conscious of both point and view. Making perspectives explicit increases creativity, innovation, conflict resolution skills, and prosocial behaviors such as compassion and empathy.

We could not find a single instant in the vast realm of human knowledge that did not hold the same four repeated patterns. Mathematics, physics, chemistry, biology, psychology, economics, dentistry, trail building, road paving, skateboarding, and hopscotch—nothing deviates from this structure. The four patterns of thinking are universal and ubiquitous, repeating across cultures and disciplines. All humans think this way.

## THINKING ABOUT THINKING

In any teachable moment, we are often literally *one question away* from helping students gain deeper understanding of a topic. The gap between taking in a fact (which research has shown students are likely to forget) and absorbing a true understanding (which they are likely to retain)

can be bridged with the right question at the right moment (Bransford and Stein, 1993; National Research Council, 2000).

Many teacher-librarians are already skilled in questioning students, especially to help them assess the research aspect of their work. They look back with them in culmination activities and consider how a project unfolded and what it led to. Such metacognitive "debriefing" events unify students as a group of learners while helping individuals know themselves as students and developing researchers.

Any number of basic questions can open the door to metacognition:

- What do we all know together about this topic?
- How did we come to know this?
- So what?
- How could we take this deeper?
- How can we improve the research process?

This simple and effective approach to teaching students to look at their research process—in other words, to understand how they gather content—can be replicated through analogous questions that enable them to track and understand how they think. The missing questions are well within our reach, falling into the four categories of the four patterns of thinking. And while they are basic and painless, they are also powerful: one simple question can bridge the gap between *what to know* and *how to know*.

The beautiful thing about the universality of the four patterns is that teacher-librarians are all already using them. The patterns are familiar. When children name and define a concept, they are making a distinction. Whenever children see cause-and-effect at play, they are recognizing a relationship. They use the four patterns daily in school and life with no idea that they are doing so. Librarians can train students in this process by getting them thinking about thinking—about how they approach any knowledge to come to understand it.

The question "How is a spider different from an insect?" trains students to consciously make distinctions. They learn to compare and contrast when they are trying to work out the boundaries of one concept in relation to similar or related concepts. Teacher-librarians can further

make students aware of their thinking by being explicit about what we observe when we see them using any of the four patterns. For example, "That is an interesting differentiation you are making. Let us recognize that you are differentiating between two things, and that differentiation is a skill—a skill that falls under distinction making."

When we see students organizing part-whole systems (or working to understand how anything works), we can simply ask, "What are the parts of a fire engine?" Or of the legislative branch of the U.S. government, or of a fox den, or of absolutely any concept—all objects and ideas are made up of parts. With systems we can always help students notice that those parts have parts, and these parts have parts too. Looking the other way, we can ask, "What whole is our whole a part of?" A fire engine is part of the world of the firehouse, and that is part of our city's public safety program. Thus, students come to look for the embeddedness of part-whole structure in everything through a two-part inquiry habit: *What are the parts of X?* and *What is X a part of?*

When students need to recognize a relationship, we can ask them "How is the Gila Woodpecker related to the Saguaro Cactus?" Or, "How is the concept of *interdependence* related to the concept of *ecosystem*?" When we put two concepts together, what are we implying? When Barack Obama was a candidate for the United States presidency, an implicit relationship was made by those who published pictures of him in a turban. We help students make that relationship explicit by asking about the implications of an image that puts together Obama and a turban. "What does this relationship say about Obama?" "What does this relationship say about Islam?" This naturally leads to questions that probe content deeper: "Is this true?" "Is it valid?"

With perspective taking, we can help students understand that a perspective exists even when it is unstated. A textbook from Virginia contained the sentence, "Life among the Negroes in Virginia in slavery time was generally happy" (Simkins, Jones, & Poole, 1973). We can ask them, "Whose perspective does this idea come from?" "How would this be presented from a slave's perspective?" This example in partic-

ular brings home the fact that deeper thinking occurs for students who learn to ask themselves such questions. Another important and profound direction to go with perspective taking, especially after students have researched what others say about a topic, lies in the simple question, "What do you think about this topic?"

With the Patterns of Thinking method, we can stop wondering about how to teach students to think and get on with the process. For students of all ages, across all grades, through any subject matter, with any book in the library, and any enrichment activity created by teacher-librarians or generated in collaboration with classroom teachers, we can rely on the four patterns of thinking plus simple lines of inquiry to facilitate the balance between content and thinking. Finally, we can teach both *what to know* and *how to know*.

## TACTILE MANIPULATIVES

Laboratory and field studies show that incorporating tactile activities into any lesson engages multiple sensory systems and areas of the brain in the learning process. Students have increased recall of information, deeper understanding of lesson content, and core thinking skills are developed (Minogue & Jones, 2006). Learners of all ages can better grasp concepts when they can literally *grasp* them with their hands.

To illustrate, consider ThinkBlocks, used by teachers, professionals, and students from pre-K to PhD to externalize and manipulate their ideas.

ThinkBlocks not only clarify the students' thinking but render the thinking process visible. ThinkBlocks support both cognition and metacognition.

Each dry-erasable ThinkBlock functions as a single idea. When we label a block *Westward Expansion*, for example, it holds that identity and becomes differentiated from every other idea. We thus make a distinction. Since ThinkBlocks come in three sizes, we can organize nested systems (Figure 2). We drop medium-sized blocks into the big block of *Westward Expansion* to represent the populations that shaped and were shaped by this historical era: *the United States government, Native Americans,*



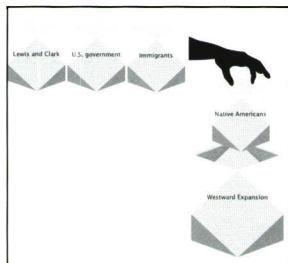


ThinkBlocks

While teaching a class at Cornell University to guide PhD candidates from various fields in writing their dissertations, I saw students struggle as they tried to focus, organize, and develop their thoughts. Their thinking was muddled and their ideas entangled. Knowing the importance of touch to thinking, and with the patterns of thinking in mind, I headed to my garage (where else for good solutions?). There, I sawed up some white boards and organized them into 3-dimensional blocks that the students could both handle and write on. I made more blocks in the same shape at two smaller levels of scale. Then Velcro did the job of connecting one block to another. Finally, I added a reflective surface on one side of the blocks. These were the first prototypes of ThinkBlocks. For more information, visit [www.ThinkandThrive.com](http://www.ThinkandThrive.com).—Derek Cabrera

*immigrants, and the Lewis and Clark expedition.* We can dig deeper by exploring the characteristics and beliefs held by each of these populations. We do this by dropping small blocks into the medium blocks and naming those traits—one trait per block.

FIGURE 2



Westward Expansion

The key is in handling the blocks and dropping them into other blocks as we name the part of a larger whole that each one represents. Documented research tells us that kinesthetic learners benefit highly from the gesture and movement involved in handling blocks and dropping them into one another (Pfeifer et al., 2006; Striano et al., 2003).

Because ThinkBlocks are magnetic, we can construct the relationship between the land and the four populations we identified as characters of the Westward Expansion. We do this by connecting a ThinkBlock labeled *Native American* to a ThinkBlock labeled *Land* (Figure 3). If we insert a smaller block between the two, that block represents the relationship.

Students can “blow up” and zero in on the relationship by using a large block and then building it as a system. We drop in medium blocks as we name the different

## BOOKMARKIT



LIZETTE HANNEGAN  
& SHARON GROVER

### AUDIOBOOKS <

#### ELEMENTARY

As we have noted in previous columns, one of our goals has been to showcase current audiobooks that have strong instructional themes and connections. During the summer months, take some time to enjoy these recent titles that tell wonderful stories and demonstrate excellent audiobook production.

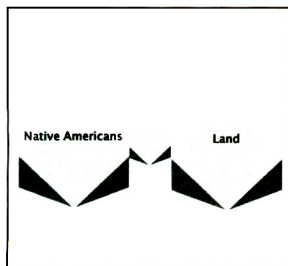
Key: C=cd, c=cassette, h=hardcover, p=paperback

**Alice's adventures in Wonderland.** Lewis Carroll. Read by Jim Dale. Listening Library, 2008. C: 978-0-7393-6765-0. \$30.00. Grade 3 and up. This classic makes for great family listening, thanks to the remarkable talents of Jim Dale. Lewis's absurd world is vividly realized with all of its whimsical humor through a narration giving a distinct voice to each of the many characters. Laugh and wonder along with Alice as she encounters the White Rabbit, the Mad Hatter, the Cheshire Cat, and more.

**Celia Cruz, Queen of Salsa.** Veronica Chambers. Performed by Michelle Manzo. Live Oak Media, 2008. P/C: 978-1-4301-0279-3. \$28.95. Grade K and up. A rhythmic musical background immediately engages young listeners with the Cuban singer. The tropical flavor, the outstanding performance by Manzo, the story of Celia's rise to fame, and the inclusion of one of her songs, make this a good choice for Latino heritage, cultural contributions to music, and the encouragement of talent in young people.

**My one hundred adventures.** Polly Horvath. Read by Tal Alexandra Ricci. Listening Library, 2008. C: 978-0-7393-7164-0. \$45.00. Grade 4 and up. Set in a seaside town during summer vacation, this story introduces Jane, a 12 year old who promises herself memorable adventures and keeps a list to remember them. Her wishes come true when she rides in a hot-air balloon, babysits under duress, and wonders who her mother's new friend is. Horvath's trademark humor is evident as Jane fulfills her quest to have an “interesting” summer.

FIGURE 3

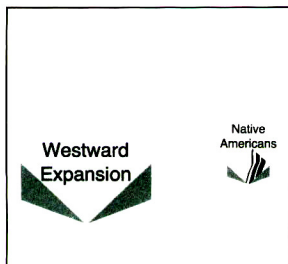


#### Native Americans

aspects of the relationship: they lived close to the land; they lived on land without owning it; they had already been there for many generations. It is important not only to identify that a relationship between two ideas exists but, more important, to explicitly examine the relationship as a separate idea in and of itself that can be further examined as a distinct system.

Turning the reflective surface of one ThinkBlock toward another demonstrates perspective-taking. In Figure 4, we take the *Native American* block and point its reflective surface toward the *Westward Expansion* block and ask, "How did the Westward Expansion look to the Native Americans? What did it mean to them? How did they respond?" Students see that each population involved has a different perspective on the event.

FIGURE 4



#### Image of the block

The students' thinking skills are strengthened as they learn to consider any event from more than one point of view.

As they do this repeatedly throughout their education, they learn that any reporting of an event is shaped by a certain perspective—and that we must recognize the influence of perspective on the potential accuracy of any account.

ThinkBlocks are not necessary for a deep and thorough use of the four patterns of thinking. They are useful because they nest and connect and have surfaces you can write on plus one reflective surface. But it is possible to work physically with the patterns of thinking by using bowls and buttons or pieces of chicken and toothpicks. You just cannot write on pieces of chicken.

### INTEGRATING THE FOUR PATTERNS

However you work with them, the four patterns of thinking work together to form an integral whole. None exists singly in isolation; all four are at play in all that we think about. We cannot make a single distinction without eliciting part-whole thinking, relational thinking, and perspective taking.

As children get older, they can integrate and become aware of integrating the four patterns. They can go beyond formulating a distinction to reformulating the distinction by taking a different perspective. Teacher-librarians can build off the thinking skills children acquire in the lower grades by taking their questioning a step further into integration. For example, once we recognize a relationship, what are the parts of that relationship? How do the parts of a system change if we look at it from another perspective?

This gets increasingly sophisticated in the upper grades. If we have a system whose parts we have defined, such as biology, and we relate it to another system, such as chemistry, what are the results? Biochemistry is not only the relationship between biology and chemistry. It becomes a whole system unto itself with its own name (representing a new distinction made) and its own unique parts—books, web sites, conferences, experts, teachers—all particular to biochemistry.

Throughout high school, as students prepare for college, we can train them to

apply the patterns of thinking to any specific content knowledge and any area of research. This will enable them to achieve their full academic potential in any subject area.

### CREATING 21ST CENTURY THINKERS

Students schooled with the four patterns of thinking infused into their curriculum will be able to make distinctions, organize part-whole systems, recognize relationships, and take multiple perspectives. They will also have a number of crucial skills in place that integrate the four patterns of thinking. All of this amounts to the building of robust thinking skills. Students will be able to do the following:

- Identify and distinguish the parts of a relationship.
- Sort, group, nest, or categorize ideas from many different perspectives.
- Recognize the part-whole structure of Distinctions, Systems, Relationships, and Perspectives
- Reformulate a distinction by taking the perspective of the "other".
- Recognize and note the invisible "other" whenever new parts, perspectives, or relationships are formed.
- Demonstrate relational thinking by taking second and nth order perspectives.

The mastery of those skills should occur progressively throughout their education. Then, what we will see as they graduate and move out into the world is that they have become 21st Century thinkers with advanced thinking skills and the ability to solve complex problems and meet new knowledge without fear. They will be able to:

- Differentiate between the content and the structural patterns of ideas.
- Recognize like structural patterns in unlike content.
- Recognize similar structural patterns across subject areas to facilitate interdisciplinary transfer.
- Build analogies, metaphors, and similes and demonstrate how small changes transform meaning.
- Innovate new solutions to complex problems by seeing alternative constructions and avoiding lock-in.
- Demonstrate flexible thinking skills to adapt to changing needs or variables.



As teacher-librarians continue to use their unique opportunity to be flexible with our learners, they can emphasize the beauty and richness of the content in every book and activity even as they consistently teach students to think. And just as they teach them to look at their research process along the way, they can equally teach them to think about their thinking process as they move through the process of acquiring a broad base of knowledge.

- Construct simple, elegant, universal, fractal, symmetrical models.

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