No good teacher ever wants to control the contour of another’s mind. That would not be teaching; . . . but no good teacher wants the contour of another’s mind to be blurred. Somehow the line between encouraging a design and imposing a specific stamp must be found and clarified, . . . all so that the student may turn himself not into you but into himself.

—Giamatti, 1980, pp. 28–29

If teachers from across the grades, disciplines, and range of teaching styles can agree on one thing, it is that lack of analytical, organizing abilities is the ultimate academic downfall of many students. Teachers’ desperation echoes in the hallways of elementary schools and colleges like parents’ desperate calling out for their children to clean up their rooms: “If only my students could organize their ideas!” This need for organization is the major reason why graphic organizers have spread so rapidly through schools at every grade level and across all disciplines. A second major reason for the spread is that, as shown in Chapter 2, the published research on graphic organizers and practical use of these types of visual tools is extensive, with significant statistical influences on improving students’ performance. A third reason is that new electronic-computerized technologies developed over the past 20 years enable fluid use of graphic representations and explicitly show students visually how to climb to higher levels of organizational structure.

Here is a very rich description of the intersection of graphic organizers and technologies from a former teacher, Greg Freeman, who has worked extensively with graphic organizers and new technologies.
As Greg Freeman points out, the interplay of electronic media and traditional paper-pencil are helping our students of this information age grapple with the problem of transforming information into knowledge. But what do students think? Here are some of their opinions.

**Words of Wisdom About Graphic Organizers**

Students in Suzanne Dobbs’ history classes at Brethren Christian Junior and Senior High School in Huntington Beach, California, find graphic organizers (G.O.’s) to be welcome tools through which they can wrap their minds around the daily dynamic work of schooling. After reviewing their Web site on graphic organizers, I asked for their words of wisdom. Here are a few:
G.O.’s give you something to do, like drawing and coloring, while the whole time you’re actually studying!

—Joel Lazo Jr.

When I was studying off of my G.O.’s, I realized that it was a lot easier than studying out of a book, almost like using a really good outline.

—Carin O’Hara

G.O.’s are easy to study from because they pick out the main ideas and all the details so you can do well on the test!

—Jaime Knowles

I like G.O.’s because I can take school work and change it into something I like.

—Billy Roberts

I just look at it and know exactly what I’m studying and why to study.

—Mia Fatticci

I like to design G.O.’s. It is more fun and easier to study from them than reading your book or notes.

—Amanda Juarez

COMPARING GRAPHIC ORGANIZERS AND BRAINSTORMING WEBS

Graphic organizers are a type of visual tool often designed for the purposes of analytically structuring and displaying information. Most of these visual tools are created for content-specific tasks and for defined process skills reflecting particular content patterns within a body of knowledge. What is the difference between brainstorming webs and graphic organizers? Figure 5.1 gives you a visual overview using a Thinking Map called the Double Bubble Map generated with Thinking Maps Software. As the information shows, graphic organizers are often teacher centered and distributed in the form of a worksheet or blackline master for students, whereas the brainstorming webs are open-ended and require students to generate their own visual structuring of knowledge. Unlike brainstorming webs, these graphics are formalized, teacher created, refined, and rule governed to fit a specific content learning process. Students are given a certain visual design and systematic process for using the graphics and text to guide them through a task. Flexible use is sometimes encouraged, but within the boundary of the task, as it is difficult, on most of these graphic organizers worksheets to actually expand the graphic.

Some graphic organizers, though they border on rote processing of information, may be extensions of traditional organizing charts and templates and thus are effective for the content or process purpose. These include charts, matrices, and axis
diagrams, all of which are used mostly for charting preformed information for presentation. Most important, with a brainstorming web (or concept mapping and Thinking Maps), students gain ownership of the visual tools, whereas traditional graphic organizers are often not student centered. Although brainstorming webs and graphic organizers may seem worlds apart, both draw on the ever-present power of visual representations to show interrelationships, though in a different way and with a different purpose. Webbing primarily facilitates the unbridled generation of ideas with idiosyncratic graphics and secondarily promotes organizational, analytical structuring of information. Whereas creativity may be a byproduct of some graphic organizers, each design is primarily a supportive guide for organizing ideas toward a specific outcome.

Karen Bromley and colleagues (Bromley, Irwin-De Vitis, & Modlo, 1995) offer a very helpful set of seven basic filters, or steps, for evaluating the usefulness and meaningfulness of graphic organizers in their book *Graphic Organizers* (Figure 5.2). These seven guides suggest that teachers should actually learn from the generative qualities of brainstorming webs and make sure that students are using graphic organizers more dynamically in practice. If school leadership teams, and then teachers from across whole schools, adopted this filter as a starting point for reviewing the use of graphic organizers as described in this chapter, the common blackline master and duplication of these visual tools would soon fade and students would elevate their uses of these tools to the highest levels. Bromley is offering a vision of the use of graphic organizers that is significantly different from the common uses in classrooms: ultimately organizers should be student developed, flexible, and used as reflective tools.
This view resonates with the need for students to move toward higher-order thinking as independent learners. In terms of Benjamin Bloom’s Taxonomy of Educational Objectives (see Bloom’s revised taxonomy in Anderson et al., 2001), the cognitive capacities to analyze and synthesize information (organize, break down, and reformulate) are the steps toward evaluative thinking. Yet, even the lowest level of Bloom’s taxonomy—knowledge—is defined as the basic organization of content. It is no wonder, then, that most students have difficulty with complex tasks. They have the intellectual capacity, but do not have the intellectual tools for constructing, patterning, and reforming information into meaningful, organized knowledge. Importantly, even the most basic level of organization of information is inherently conceptual. Unfortunately, retention of isolated content knowledge by rote memorization is overly emphasized in classrooms instead of retention through the development of organizational designs and conceptual understandings. The general processes of organizing information require that learners go well beyond the retention of isolated bits of information. Students must have the know-how to analytically construct
interrelationships so they can evaluate knowledge. This process takes mental energy, perseverance, and much more: it also takes the support of focused linear and non-linear organizational tools that reflect different content-specific patterns of knowledge and conceptual structures.

In this chapter we investigate a wide range of graphic organizers and their uses, from useful starting points, or templates, to more “dynamic graphics.” Graphic organizers begin with a relatively clear structure on a page or in the mind and are expanded according to the established pattern. This different type of visual tool thus becomes a focal point for facilitating a different array of habits of mind.

ORGANIZERS FOR HABITS OF MIND

Unlike brainstorming webs, which facilitate creatively “thinking outside the box,” most graphic organizers are often structured to support students in analytically “thinking inside the box.” A teacher may create or find in a teacher’s guide a specific visual structure that students follow and “fill in” to proceed through a complex series of steps. This scaffolding is sometimes essential for some students. Often teachers match specific patterns of content (plot in a story) with the development of process skills (a sequencing organizer). I often call graphic organizers “task-specific” visual tools because of their focus on using a single graphic that is clearly designed to help students achieve a certain objective, outcome, or standard.

These highly structured graphics may seem constraining at times, yet they are fruitful for many students who have trouble systematically approaching a task, organizing their ideas, and staying focused (especially when the task is complex). For example, many organizers are sequential, showing the guiding steps for solving a word problem, organizing content information for a research report, learning a specific process for a certain kind of writing prompt, or for a “story board” highlighting essential skills and patterns for comprehending a story. Because these types of visual tools are highly structured, they directly facilitate several habits of mind, as defined by Art Costa, such as managing impulsivity, persistence, striving for accuracy, and precision of language and thinking. Return to the Tree Map for Habits of Mind presented in Chapter 2 for a graphic view of these specific attributes of thinking.

Review almost any graphic organizer—found in a textbook or teacher created—and you will find that the visual/spatial structure guides students through the steps, box by box, or oval by oval. Teachers report that one of the main advantages of using graphic organizers is that they provide a concrete system and model for proceeding through a problem that students would otherwise give up on because they have not developed their own organizational structures to persevere in completing the task. An obvious reason is that the visual structure reveals a whole view of the process and, importantly, an end point.

This kind of structuring also provides some visual “guidelines,” much like a safety rope learners can hang onto—and a structure to hang onto information—rather than impulsively jumping outside the problem to what Benjamin Bloom called “one-shot thinking.” The visual modeling thereby shows students that they can decrease their impulsivity, persist, and stay “in the box” when they need to focus on following through to a solution.

This kind of modeling also lends itself to greater accuracy and precision of language and thinking. Oftentimes students don’t have a record of their thinking—the
steps and missteps along the way—and have a hard time differentiating one idea from the next. By capturing their ideas along a visual train of thought to a solution, students can look back on their ideas, refine them, and share them with others for feedback. These habits of mind are facilitated by most graphic organizers in large part because of the visual dimension, but also because the brain both needs and loves to organize!

**CHUNKING, MEMORY, AND THE ORGANIZING BRAIN**

In the previous chapter on brainstorming webs, we saw that webs and mind maps almost always start in the center of the page and flow outward, radially, drawing out and linking associations guided by few rules. Obviously, these relatively conscious associations being made are actually quite sluggish compared to the linkages each association is making deep in the unconscious, internal functioning of the brain. Whereas brainstorming webs are commonly understood to be based on associative logic, most graphic organizers are often derived from formalized processes. These organizers build students’ abilities to consciously “chunk” information.

From the mid-1950s on, we have believed that the brain automatically associates bits of information into “7 plus or minus 2” chunks (Miller, 1955). This chunking is now getting a tremendous amount of attention, with brain research reinforcing behavioral research, especially regarding how it supports the transfer of information from short- to long-term memory. Chunking happens unconsciously as the brain grapples with new information and pulls up information from long-term memory. Chunking may also be consciously engaged and may be improved when teachers introduce graphic organizers into the classroom in a meaningful way.

It is only through the chunking of information that we can get hold of infinitesimal and infinite actions of the brain, the stream of consciousness. When students chunk information, they are transforming it into a formalized array of information. Graphic organizers have been successful because these tools allow students to create a logical and spatial arrangement of the chunks of information bit on the page rather than having to do all of the chunking in their minds.

The active chunking of information onto a page is much like constructing a constellation from a sky full of stars. Students can scan information, make sense of it, and see the pattern that the teacher is helping them connect. They can remember the visually chunked information better this way along with the auditory chunking that occurs when a teacher delivers information through a lecture or in lines of text written on the front board.

Robert Sylwester makes this point as he relates chunking to the curriculum:

The curriculum enhances this remarkable brain capability when it focuses on the development of classification and language skills that force students to quickly identify the most important elements in a large unit of information. (Sylwester, 1995, p. 93)

In designing curriculum, publishers, curriculum directors, and teachers usually “chunk down” the content. We normally start with the big themes and break them down into manageable, smaller chunks. Heidi Hayes Jacobs’s work with mapping curriculum is a good example of this process (Jacobs, 1997). Much like a tree, the
concepts are at the top, with the details organized into a foundation or a branch and root system of smaller chunks, and then coordinated in a sequential flow over the course of the year. The delivery of information—often through textbooks—is led by this kind of design. What Jacobs and others are attempting with curriculum mapping is to link the relatively independent content sequences into a big picture for teachers across a whole school or district.

Unfortunately, many concepts and ideas are presented to students in a deductive, preprocessed fashion with no clarity about how it all fits together. The organizing has already been done by the textbook, the teacher, or the computer program. By and large, students are supposed to see the big picture on their own and are rarely given the tools to put it all together other than through tests of their discrete knowledge. The students are asked to “learn” the information in a deductive way: taking notes, memorizing the information as organized, and giving back the information in written or verbal, that is, linear form.

So where do graphic organizers fit into this discussion? Many of the early and present graphic organizers are highly structured advanced organizers and templates into which students fit information. These preformed graphics have been successful because they match the capacity and needs of the brain to pattern information, to move the information from short- to long-term memory, and to make the information more meaningful. Although some students may find prestructured graphics helpful when confronted with complex tasks or concepts, they may sometimes be just a more sophisticated tool for replication, not the transformation or construction of new knowledge.

In these cases, I believe that graphic organizers act much like training wheels for a child learning to ride a bike—useful in the beginning but downright clumsy and embarrassingly extraneous in a very short time. We would not ask a 6-year-old who could ride a bike to keep the training wheels on, yet unfortunately textbook publishers and graphic organizer books continue to suggest that teachers have handfuls of duplicated graphics for students to fill in. In many schools I have worked in as an outside consultant, more than a few teachers have stated that their students are bored by graphic organizers.

When students become fluent with using preformed graphic organizers, they want to begin to control their own patterns of information and knowledge generation, and not have their minds controlled, as Giamatti warns in the quotation at the head of this chapter. They have the capacity to construct their own processes and visual tools for chunking information—and thus constructing knowledge. They want to move from strictly top-down, deductive reasoning, to bottom-up, inductive reasoning. They want to begin chunking content and developing concepts on their own.

From all of the preceding perspectives—words of wisdom from students, brain research, and Costa’s habits of mind—the mantra that may come to your mind about graphic organizers is that these are tools and should not remain templates. We now look at some of the best ways of systematically bringing these frameworks into classrooms so that not only are students not bored by staying within the lines, but they are guided to seek key relationships on which they will be evaluated. To summarize this general introduction to graphic organizers, I have created a list of seven warning signs that you can use as a reflective framework for previewing these graphics in basal programs and textbooks, and for using graphics in your classroom, school, or district (Figure 5.3).
Figure 5.3 Seven Warning Signs That Graphics Aren’t Working

**Paper and Mind Wasting?**
If you find yourself running to the copy machine throughout the year with blackline masters that students could create on their own.

**Fill-in the Blank Repetition?**
If you find yourself handing out the same graphic organizer without the students ever going outside the lines, or if most of the organizers are of one type.

**Isolated?**
If you find that there is no coordination of organizers, then your students may never see how different patterns work together.

**Too Many and Not Transferable?**
If you find that students have been given too many organizers—in many different disciplines—they will begin to see that these are not their tools to learn in depth but templates to fill in.

**Too Confusing?**
If your students continuously have to go back to the organizer for instructions, it may be that there are too many actions required for making sense of the information (break it down).

**Not Cooperative or Constructive?**
If you find that the instructions for the graphics are that students fill in the information and turn it in as part of their assignment without discussion; or if you lead a classroom discussion and there is one right answer.

**Not Evaluative?**
If students are not being asked: How did this graphic help or hinder your performance? How could you have created a different graphic to meet your needs? Did this graphic constrain your thinking?
For the remainder of this chapter we turn to a range of types of graphic organizers, beginning with their use as advanced organizers for students and moving to their use in curriculum mapping by teachers. In the 1960s David Ausubel (1968) introduced the idea of advanced organizers into educational practice. These organizers, as identified by Marzano et al. (1997) and described in Chapter 2 as an instructional strategy that works in classrooms, do not need to be graphic. An advanced organizer could be merely a guiding question to help students organize ideas as they read through a text. Some of these advanced organizers are note-taking guides or well developed, like Donna Ogle’s concept of the K-W-L process used by students as they list what they want to know, and reflect on what they have learned after reviewing their completed graphic.

A story organizer is a form of advanced organizer used in a content area: communication skills and English classes for studying literature. It is content specific in that it is designed specifically for the content and is not transferable to other content areas, unlike process graphic organizers, which we will look at later. This story organizer supports students before they begin to read a story so they can think about the big-picture patterns of development of the story, characters, and themes as they read the story (Figure 5.4). This graphic, which may be used in many ways from individual to group to whole-classroom discussion, leads to a rich structuring of information that also provides a bridge for a follow-up piece of writing. It is an example of how a graphic representation lays out a teacher’s verbal flow of questions and literary points of analysis much more clearly for the student:

- How would you describe the setting?
- What is a summary plot (beginning, middle and end) of the story?
- Compare and contrast two main characters.
- What are the major theme and at least three supporting ideas or minor themes?

In this case, students are actually given the “road map” of questions through which they can see the whole process. They can see where the questioning is going, jot down responses, and see how the parallel questions about two characters come together to form a rich analysis. More students per classroom will be able to follow discussions, stay on task, and be able to move to a higher level of comprehension with this road map in hand. What is most important here is that students soon move from this advanced organizer for story analysis to being able to organize their own thinking without having to fill in the boxes and ovals on a preprinted page. For an example of how this is done, you may wish to look ahead to the student work using Thinking Maps in Chapter 8.

An infinite array of these advanced organizers can be produced. They are used in every discipline: from timelines in history to matrices in mathematics. Enough has been stated about the limitations of these tools, yet it should be restated, for comparative purposes, that these are static tools focused on a particular structure of information or flow of questions. This advance organizer actually acts as a tool for
Figure 5.4  Story Organizer

**Background** The story organizer or map is a generic tool used specifically for interpretation of fiction. Other organizers have been developed for analyzing specific tasks for reading a story, such as plot analysis and rising action, and character description, comparison of characters, and for identifying thematic structures. Story organizers such as the one shown below are used to support students in bringing as many of these aspects of the story analysis together on a single page. It reinforces for students that most of these dimensions of the story must be included in the interpretive process for a complete analysis.

**Basic Techniques**
- Introduce the graphic by telling students that they will later be able to create their own design for a story organizer.
- Model the use of the organizer in front of the class by working through the steps using a story students have already read and discussed.
- Have students work in pairs and then independently until they can draw, expand, and complete the organizer from a blank piece of paper.

**Novice**
- is able to fill in the sections of the organizer with guidance from a teacher.

**Apprentice**
- is able to complete the organizer independently and groups by adding boxes and ovals when necessary.

**Practitioner**
- is able to draw a similar story organizer from a blank page and use it to write or present a story review.

**Expert**
- is able to identify and expand the different aspects of the organizer in order to develop a rich interpretation of a story.

advanced planning, as a focus during reading, and as a reflective and writing plan for after reading. But this multiple-organizer approach also does not provide much depth of thinking about each of the four literary dimensions listed above. This is a common problem with many graphic organizers: too many different patterns being integrated on a page without depth. One of these macro-organizers could be
deepened by shifting to another organizer, such as one designed especially for analyzing the theme of the story (Figure 5.5). Students and teachers can move from a macro view of various dimensions of the story and to looking specifically at the themes, secondary themes, and details that draw from the macroview. Combining organizers of different types from the story organizer, each with depth in one area, enriches the quality of instruction and learning.

Figure 5.5a  Theme Organizer

**Background** The theme organizer is a generic form that has been developed and used by many teachers and curriculum developers. It is a key tool in Richard Sinatra's collection of text structures in the Thinking Networks approach and Sandra Parks' "Graphic Organizer" books. It is used as an organizer for reading comprehension across disciplines for supporting students in identifying a main theme, supporting ideas, and details. In this way, it is based on the cognitive skill of categorization, or the grouping of information. Students identify the main theme of a piece of writing and then group the key supporting ideas and details together into smaller boxes. Most often this organizer is presented to students as a blackline master.

**Basic Techniques**
- Begin by identifying that the text structure is based on developing a central theme and supporting ideas.
- Before, during, or after reading, write the main theme of the idea in the center box.
- Continue by adding the secondary ideas in the boxes extending from the central theme and adding details to each.
- Add or delete boxes as necessary.

**Novice**
is able to fill in a blackline master with the theme and supporting ideas with guidance from a teacher.

**Apprentice**
is able to clearly distinguish between the theme, supporting ideas, and details, and add boxes.

**Practitioner**
is able to make connections between the supporting ideas while constructing the organizer on a blank sheet of paper.

**Expert**
is able to transfer this organizer into every discipline area when reading and writing.
There are many clear examples of basic process organizers based on facilitating thinking skills that, unlike the preceding examples, can be easily transferred by students across disciplines. The most commonly used organizer is the Venn diagram, developed in 1898 by John Venn as a logic tool for showing category structure. It is important to note confusion arising from teachers using Venn diagrams differently across disciplines for two different cognitive skills: categorizing and comparing. This is unfortunate because students will need to use this tool in mathematics to show overlapping categories.

Influential books in this area date back to the early 1990s, full of graphic organizers with a range of visual tools for categorizing, comparing, sequencing, and cause-effect reasoning. The repeated use of these forms—often suggested as blackline masters—has developed a specific way to apply these process/thinking skill organizers. This is a positive beginning because students develop automaticity in the
skill, but the blackline masters should be used for introductory purposes and then quickly discarded so that students may create their own graphic structure and gain independent control over their own thinking.

There are many other examples of these basic cognitive organizers. James Bellanca collected two dozen of these graphics in *Cooperative Think Tank, I and II* (Bellanca, 1991). He shows in very explicit terms how to develop process organizers. Working with individuals and cooperative learning groups, he models the dynamism of the tool linked with interactive classroom thinking. For example, the “Fish Bone” is a long-used tool for collecting, organizing, and then linking causes to a single effect. Figure 5.6 shows the steps involved in using this technique.

In summary, the difference between process graphic organizers and content or “task-specific” graphic organizers is this: students are learning and practicing a thinking process in visual form in depth that can be applied to and transferred into other disciplines (with extensive practice and whole-school involvement), rather than using a graphic handed out by a teacher just a few times to learn a content skill, only to discard the tool and never use it again.

**THE BIG PICTURE ORGANIZERS**

In the dimensions of learning approach (Marzano et al., 1997), graphic organizers may be used across dimensions for acquiring and integrating knowledge (Dimension 2), extending and refining knowledge (Dimension 3), and using knowledge meaningfully

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**Figure 5.6** Fishbone Organizer

**Eight steps for using the fish Bone and an Example**

1. Identify the effect.
2. Identify the category names.
3. Use a round-robin to suggest possible causes.
4. Discuss the suggested causes.
5. Privately rank the causes.
6. Use a round-robin to make an unduplicated list of the causes.
7. Vote for rank order.
8. Prepare an explanation of the choices.

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GRAPHIC ORGANIZERS FOR ANALYTICAL TASKS

( Dimension 4). When used systematically, organizers are also keys to creating positive attitudes and perceptions (Dimension 1), because there is a greater clarity of processes, tools for collaborative learning, and high expectations for working with information. And, as highlighted in this book, graphic organizers have a direct impact on productive habits of mind (Dimension 5), as identified by Art Costa.

In the discussion of Dimension 4, “use knowledge meaningfully,” several process organizers are presented for macro-processing, such as for general problem-solving steps. Using organizers in this way gives students a flow of possible solutions and pathways back when a solution is not immediately apparent. This graphic is much like the process organizers just discussed and most effective when brought to life through active teacher modeling.

General problem solving leads us into the larger concern of how to support students in moving from being able to follow a discrete problem and solve it to being able to deal with the executive functions needed to work at the macro level of solving larger problems, such as how to organize and follow through on a research project. An example of a big picture graphic organizer is the Pathfinder Research Template developed by Gwen Gawith (1987) from New Zealand (Figure 5.7). It is amazing that on just one page so much graphic support holds together such a normally overwhelming process for students. There are only five steps, but along the way students receive facilitative questions, alternative pathways, sources to reference, suggestions for capturing information, and hints to get help when stuck within the process. Notice that at each step a question, rather than a to-do list, is offered.

Within this macro-organizer you can also see full integration of different types of visual tools. Before step 1, the students are asked to brainstorm ideas about the topic using webbing and to focus a broad topic “chunked down” by revising their web. Within steps 4 and 5, students are asked how they will organize and present the information, with sketches, diagrams, and charts. This research template, or Pathfinder, is a synthesis of a whole process, which includes diagramming templates, Mind Mapping, keywording templates to categorize information, and presentation templates. Although Gawith’s Information Alive! booklet (1987) is out of print, her updated version, Learning Alive! (Gawith, 1996), for teachers of secondary students, is a rich extension and deepening of her first text on action learning. In the next chapter, the Visual Unit Frameworks design, created by Christine Ewy and based on conceptual mapping, takes this macro view of transforming information into knowledge to the center of the teaching, learning, and assessing cycle of classrooms.

MAPPING LESSON PLANS

The research template shown earlier could well be used by students, teachers, administrators, and planners in the workplace. We already have examples of graphic organizers used in schools for organizing, analyzing, and evaluating classroom planning and larger organizational structures called curriculum. Many examples exist of lesson plan design tools that are graphically structured.

More recently, with the greater emphasis on complex integrated, thematic, or interdisciplinary curriculum designs, the need for graphic representations has increased. The “Planning Sheet” shown in Figure 5.8 begins with the identified theme in the center. The teacher then uses the template subject-specific applications and detailed language investigations to expand and link the theme through the disciplines. Whereas teachers usually use such graphic templates, students can also use
Figure 5.7  Pathfinder Research Template

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Figure 5.8  Interdisciplinary Planning Sheet

them to record the array of activities surrounding the topics of “Change” and “Space.” Students often need powerful tools like these because they reduce abstract, complex activities to a concrete and simpler representation. After going through a series of enlightening activities in an interdisciplinary unit, students are often left with no road map to show where they are going, how they are faring along the way, and how they can reflect on the trip they have taken.

To organize the big picture, students can use a research template, teachers (and students) can use an interdisciplinary design wheel, and teachers and administrators together can use detailed matrices for mapping the complex flow of curriculum from classroom to classroom, school to school in a district. In Mapping the Big Picture, Heidi Hayes Jacobs (1997) uses a graphic charting of curriculum as the central tool and organizing form for

- collecting evidence of the existing state of what is being taught and when in a school or district;
- analyzing the flow, connections, and gaps in the existing curriculum; and
- constructing new forms to systematically link curriculum and instruction.

This approach brings a high level of organizational consistency and efficiency that otherwise would not be possible for taking on a complex systems problem. No doubt this work is challenging, time consuming, and an adventure into the politics of districtwide structures, especially when all of the stakeholders are included in the process. And it is hard to imagine being able to conduct this process without a graphic template and the software program that provides ease of entry, revision, and speed toward completion before participants bog down in details of the process.

What are the implications of this example for present students and for lifelong learning? If we want students to understand and express their conceptual and theoretical understandings within knowledge domains—and if we understand that these concepts are fundamentally nonlinear—then we need to give them the graphic tools to show these models. Larry Lowery (1991), a leader in science education and stage development of thinking, provides a description and graphic example of an advanced stage (that all learners can attain) of flexible thinking (Figure 5.9). Here, the learner takes an organization structure such as a taxonomy and

becomes able to develop a framework based on a logical rationale about the relationships among the objects or ideas in the taxonomy, while at the same time realizing that the arrangement is one of many possible ones that eventually may be changed based on fresh insights. This stage of thinking can deal very flexibly with complex situations. Each field of endeavor produces new knowledge and further insights. Resolutions to problems and knowledge generation often take many forms. (Lowery, 1991, p. 113)

The emphasis here on “arrangement,” complexity, and forms of knowledge reveal that to think flexibly and gain new insights, students must be able to go well beyond textbook information to arrange (spatially) complex (linear and nonlinear) information into different (graphic) forms. Without graphic representations, most students’ mental models will be stunted by a linear mass of information, a bare taxonomy chart memorized for the next exam.
Figure 5.9  Flexible Thinking


DESIGN AND UNDERSTANDING

As this chapter shows, from micro-graphics for reading comprehension of stories to macro-graphics for interdisciplinary and districtwide curriculum alignment, the design of graphic organizers is becoming an essential element to the successful representation of ideas. These are all “intelligent” tools. This chapter is no better summarized than by Grant Wiggins and Jay McTighe in their approach, Understanding by Design. The graphic design templates that are key for applying this approach are tools for learning a process, and process tools for deeper understanding:

Why do we refer to the template, design standards, and corresponding design tools as “intelligent”? Just as a physical tool (e.g., telescope, automobile, or hearing aid) extends human capabilities, an intelligent tool enhances performance on cognitive tasks, such as the design of learning units. For example,
an effective graphic organizer, such as a story map, helps students internalize the elements of a story in ways that enhance their reading and writing of stories. Likewise, by routinely using the template and design tools, it is likely that users will develop a mental template of the key ideas presented in this book: the logic of backward design, thinking like an assessor, the facets of understanding, ... and design standards. (Wiggins & McTighe, 1998, p. 180)

In any learning organization, ideas need to be organized, yet too much organization isn’t necessarily the solution. We have all worked with some students and coworkers who cannot live outside the box of some preordained organizational structure. They are trapped, and trap others, in a static world when in fact the world is often messy, ambiguous, and dynamic. This is the conundrum of the use of graphic organizers: sometimes too many organizers are handed out as fill-in-the-blank worksheets that actually may confuse students’ thinking.

Our natural world has complex and stable organizational structures that are also in a state of transformation. This is best reflected by chaos theory, which posits that even within seemingly chaotic systems there are relatively stable structures and patterns. And this is reflected in our lives. Both the unique organizing structures and sensory systems of our brain and our conscious capacities of mind enable us as human beings to slow the world down so we can make organizational sense of it. The organizing minds of our students are constantly learning new ways of both seeing and organizing the information taken in by the senses. Yet this process takes time—a lifetime! This is because as we mature and shift from job to job, or across content areas, we are learning about new and ever more complex organizational structures. Graphic organizers, especially when used dynamically, offer students a wide array of analytic visual structures that they can draw on lifelong.

In the following three chapters on conceptual mapping and Thinking Maps, we investigate how the analytical organizing capacity of graphic organizers and the creative brainstorming in webs can be synthesized into highly creative-analytic forms, and an evolved, third generation of visual tools.