

EDUCATIONAL

**Key Quotes from the January, 1996 Article:
THINKING MAPS®: Seeing is Understanding**

Across all Grades and Disciplines in a 1,400 Student DADE COUNTY Elementary School

Principal Barbara Bell: "The key to this approach is the common thinking process vocabulary and visual language . . . The teachers embraced these maps because they were able to incorporate them directly into their everyday questioning techniques and classroom activities. Students learned the maps easily because the maps were reinforced across the whole school"

Content Area Transfer for Independent and Cooperative Learning in 6 inner city schools in BROOKLYN, NY

"Martyn Lawrence, Director of Curriculum in Brooklyn's District 13 has guided the implementation of these maps in schools there. She believes it is critical that teachers be trained "to introduce and model for students how to transfer the maps across content areas," so that students can consciously use them, both independently and in cooperative groups."

Bilingual Applications IN MIAMI and TEXAS

"Significantly, the teachers who gave the maps the highest approval rating were those who worked closely with the large population of Spanish-speaking students who are learning English."

Reading and Mathematics Test Scores Significantly Improve IN ATLANTA

"At another Title 1 school, Atlanta's Margaret Fain Elementary, reading scores on the Georgia State Test of Basic Skills rose sharply—from 29 to 69 percent. Principal Patricia Austin says Thinking Maps helped her students improve in both the reading and mathematics portions of the test."

Statewide Holistic Writing Scores Jump ACROSS NORTH CAROLINA in Elementary and Middle Schools— for 3 years

Summary results from Chadbourn Elementary School (a Title 1 School) on the Grade 4 writing test in each of three years with students consistently using Thinking Maps as tools for writing:

1992-93 : 11% higher than district/state average

1993-94: nearly 20% higher than district/state average

1994-95: a 10% jump over previous year's scores



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Thinking Maps:

Seeing is Understanding

David Hyerle

By using visual tools that correspond to thinking processes, students can organize their ideas on paper or by computer, and—as a result—read, write, and think better.

Walk through schools these days, and you will see teachers and students using a wide array of visual tools to construct, organize, assess, and convey knowledge. Semantic maps for brainstorming, graphic organizers for structuring information, and simple maps in textbook lessons are just a few tools being used to activate student learning. While educational reformers seek to restructure schools, a gradual, but fundamental, shift has been occurring in the everyday communication in classrooms.

Over the past 20 years (and more rapidly during the past five years), teachers, administrators, curriculum designers, staff developers, and even test-makers have turned to graphic representations for showing relationships. In some states, such as Texas and North Carolina, graphic organizers are showing up on tests as formal guides to find out how students are solving problems.

My first experiences with visual tools came during the early 1980s, when I began teaching writing in an urban middle school in Oakland, California. I introduced my students to the "mind mapping" and "webbing" techniques developed by innovators such as Tony Buzan, Gabriele Rico, and teachers with the Bay Area Writing Project at the University of California at Berkeley. There was a fundamental problem, however.

Despite the wealth of knowledge my students displayed on their semantic maps, they were ultimately confused about how to further organize, analyze, and evaluate their representations. They could brainstorm exciting and imaginative ideas, but they were less capable at following through with an organized, coherent piece of writing. As a novice teacher, I began asking myself: What happens to the brain after the storm?

After the Brainstorm

I became immersed in the thinking process approach to curriculum, and later devised a language of eight related visual tools—what I call

Thinking Maps (see fig. 1). These forms are designed to help K–12 students generate and organize their thoughts and ideas, either on paper or by using the software, and construct simple to complex mental models. Each Thinking Map corresponds to a single thinking process:

- *Circle map*—helps define words or things in context and presents points of view.
- *Bubble map*—describes emotional, sensory, and logical qualities.
- *Double bubble map*—compares and contrasts qualities.
- *Tree map*—shows the relationships between main ideas and supporting details.
- *Flow map*—shows events as a sequence.
- *Multi-flow map*—shows causes and effects and helps predict outcomes.
- *Brace map*—shows physical structures and part-whole relationships.



■ *Bridge map*—helps to transfer or form analogies and metaphors.

Teachers are trained to introduce students to all eight maps as a related set of tools for content learning. They then show the students how to use these maps as needed, isolated or together. Teachers can do this in a short time because each map is a concrete tool rather than an abstract definition.

For example, Figure 2 shows how a 6th grader used the bubble map to understand the story, "William Tell, the Archer and the Apple," which her

class in Brooklyn, New York's District 13 had read. The bubble map may look like a generic web, but it isn't. It is based on the thought process of identifying qualities using adjectives and adjective phrases. Students use it in analyzing character traits in language arts, attributes in mathematics, properties in science, and cultural traits in social studies.

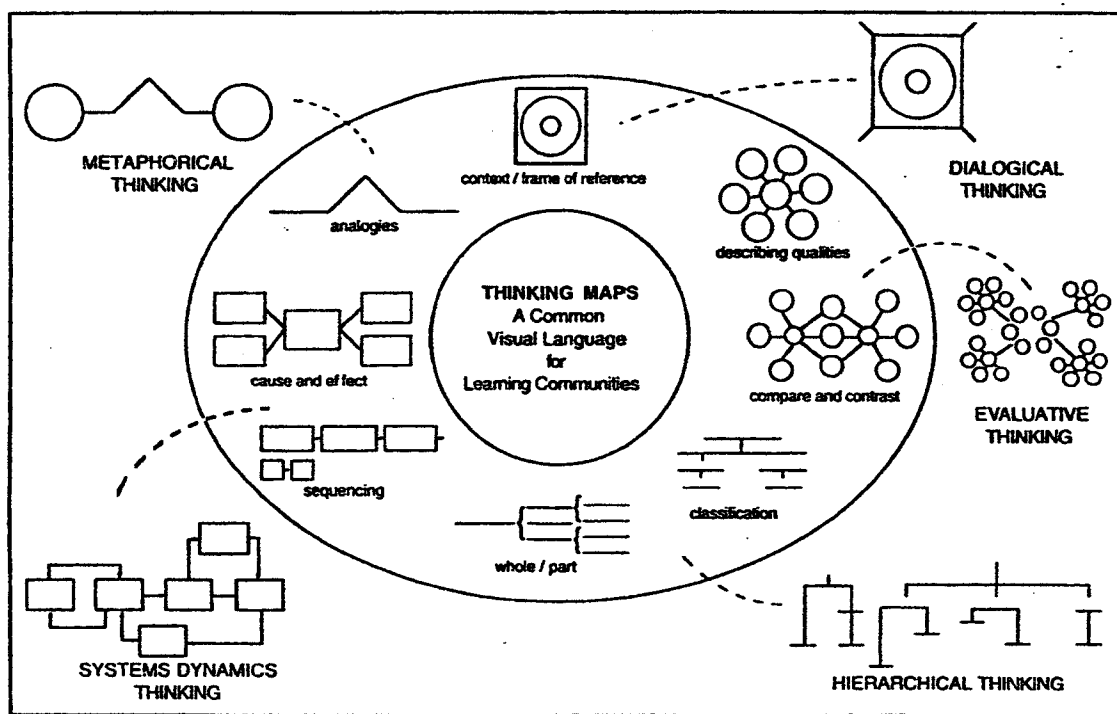
The graphic configuration of each Thinking Map becomes more complex as student thinking improves and content knowledge is enriched over time. Upper elementary, secondary,

and college students quickly become fluent in using the maps for complex tasks. Lower elementary students usually need several years to build up the capacity to use all the maps as interrelated tools.

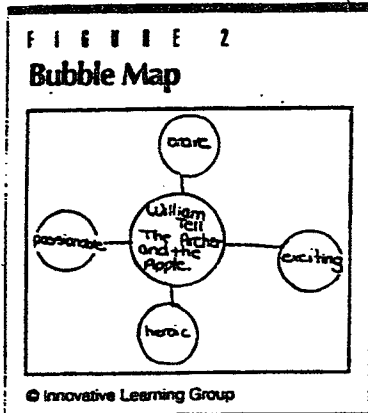
Schemes for Subtler Thinking

Typically, graphic organizers are useful as isolated strategies, but using a single graphic related to a specific task may not provide the student with the flexibility necessary to link strategies in more complex situations, such as in reading comprehension across

FIGURE 1
Thinking Maps



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disciplines and interpreting literature. For example, we may ask students to do several things while reading—to understand the context for the story, identify qualities of a central character, compare characters, and sequence what happened. These four tasks require different thinking processes that are not necessarily linear in form.

The investigation of character traits in the William Tell story led naturally—and graphically—to a comparison of two characters, using the double bubble map. By using this map, the student began to think about comparing and contrasting qualities and how the characters are similar and different. The student also used the flow map (see fig. 3) to analyze the story's plot and see the events as a sequence.

This linking of different patterns of thinking when analyzing literature is similar to structuring information and constructing knowledge in other content areas. Indeed, one can use visual representations as key tools for concept development and for the interpretation and assimilation of new information in every content area.

In science, for example, students use concept mapping or systems diagrams

to develop mental models of scientific concepts, and teachers use it to assess students' development of concepts and misconceptions (Novak and Gowin 1984). For reading comprehension, students might receive preset text structures, such as problem-solution formats, to help them organize and summarize what they read (Armbruster 1987). New Thinking Maps software will help students quickly make connections and organize information for oral reports, social studies research, science experiments, and other projects.

Researchers have found that presenting selected graphic organizers on computers helps students to see the relationships between main ideas and supporting details (as in the tree map), and that this in turn leads to higher scores on reading and writing tests (Cronin et al. 1990).

In North Carolina, many elementary and junior high schools that had introduced the Thinking Maps schoolwide in 1993–94 found significant increases in holistic writing test scores over successive years (Hyerle, in press). Researchers also have found that students enjoy using graphics for networking information and

constructing knowledge, thus shifting from passive to interactive learning.

In this age of information overflow and networking, students must be able to use multiple strategies to solve complex problems. In language arts, for example, students are evaluated through their responses to complex reading selections or to an array of writing prompts. In mathematics, they must solve multistep word problems. The new testing formats require them to complete varied tasks and show their work and reasoning.

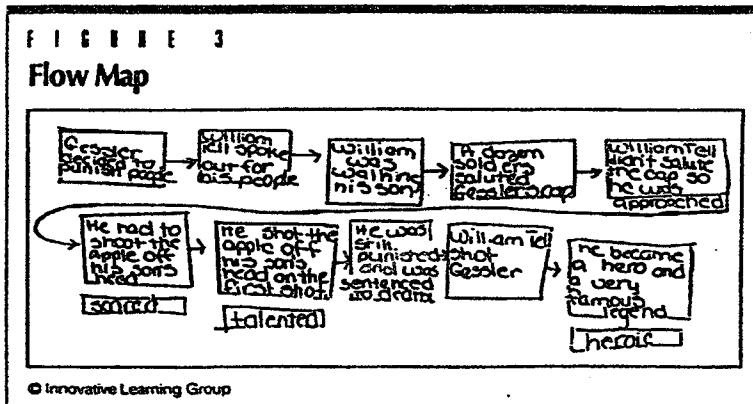
Unfortunately, most students are not prepared for these layered tasks. Barbara Bell, principal of the Joe Hall Elementary School in Miami, says one reason she adopted Thinking Maps at her school was that

it is particularly difficult to find strategies that work together to develop higher-order thinking skills.

By learning how to use Thinking Maps together, students show they can persevere and not give up in mid-problem.

Whole School Ties

In a learning community, Thinking Maps become a common visual



language among students and between students and teachers—not only within content areas but also across disciplines. In the Thinking Maps transfer approach, we work with whole schools over several years. This is essential because it offers all-important continuous support for students as they move through grade levels.

“The key to the success of this approach,” suggests Barbara Bell, “is the common thinking process, vocabulary, and visual language.” She reflects on the 1993–94 school year, during which all her administrators, teachers, and 1,400 students—from kindergarten on up—began using the maps:

The teachers embraced these maps because they were able to incorporate them directly into their everyday questioning techniques and classroom activities. Students learned the maps easily because the maps were reinforced across the whole school.

Marilyn Lawrence, director of curriculum in Brooklyn’s District 13, has guided implementation of these maps in schools there. She believes it is critical that teachers be trained “to introduce and model for students how to transfer the maps across content areas,” so that students can consciously use them, both independently and in cooperative groups.

Teachers at Joe Hall Elementary School participated in a year of professional development in Thinking Maps and follow-up support in the classrooms. They then met in groups, by grade. They brought their own curriculum ideas, along with student writing portfolios, including those showing work by bilingual, special education, and gifted students.

The teachers agreed that the maps had successfully helped students develop their thinking processes and their ability to organize ideas, improved the quality and quantity of

their writing, and also motivated them to learn. Further, the maps benefited the teachers by helping them organize content and assess student learning.

Significantly, the teachers who gave the maps the highest approval rating were those who worked closely with the large population of Spanish-speaking students who are learning English. They said that the common visual language for thinking enabled their students to transfer patterns of thinking from Spanish into English, to focus on learning, and to build vocabulary.

Portfolios of Change

When teachers collect Thinking Maps over time and within student portfolios, many interesting possibilities emerge. Portfolios enable students and teachers to see how learners are assimilating new knowledge into the big picture of any content area, and how thinking and content knowledge develop incrementally.

Karen Joslin, a teacher at Hurley Elementary School in Salisbury, North Carolina, reviewed the portfolios with her Title I students to decide which Thinking Maps were appropriate to include in their portfolios. In this way, she helped students evaluate what they knew and how they came to construct content knowledge using Thinking Maps with other strategies. Students



become aware of how visual tools support what Arthur Costa has described as their “displayed metacognition” of patterns of thinking (in Clarke 1991). Or, as one 3rd grader from Laurel, Mississippi, put it: “I see what I learn.”

In most schools, teachers find continuous development of student thinking from grade to grade much more elusive than planning the scope and sequence of a curriculum. Yet it is this kind of reinforcement of thinking processes that helps students become independent, reflective learners. Thinking process maps of all kinds become a visual crossroads for consciously linking content with process learning.

As with any innovation in education, we have encountered obstacles along with positive changes in implementation. One of the first hurdles is

Thinking Maps as Tools for Multiple Modes of Understanding

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