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as high-quality nonlinguistic representations are designed as practical, effective, dynamic, collaborative, and learner centered. Importantly, these proven tools are theory embedded, transferable across disciplines, and are becoming part of the assessment and self-assessment processes of learning. As we will investigate, graphic *languages*—which go well beyond simplistic brainstorming activities and generic “blackline master” graphic organizers—offer teachers and students a rich and coherent synthesis of isolated visual tools. Languages such as Mind Mapping<sup>®</sup>, STELLA<sup>®</sup> Systems Thinking, Concept Mapping<sup>™</sup>, Rationale<sup>®</sup> Software, and Thinking Maps<sup>®</sup>, when used with depth over time, bring about significant transformations in student performance and offer a pathway for long-term development of their thinking abilities.\*

## OVERVIEW OF THE BOOK

This book is a synthesis of two prior books, new research in the field, and also new applications with a language of visual tools I developed called Thinking Maps. In *Visual Tools for Constructing Knowledge*, published by the Association for Supervision and Curriculum Development (Hyerle, 1996), I offered a more theoretical overview of visual tools, broken into three basic and sometimes overlapping categories: brainstorming webs, “task-specific” graphic organizers, and conceptual mapping (that I called *thinking-process maps*). This first book was supported and guided by Dr. Art Costa, who wrote the prologue, and who has graciously let me republish it in this edition as a rich framework for seeing visual tools as extensions of what makes us human.

I had explored these three types of tools, highlighting that in practice they sometimes had common visual *forms*, but often significant differences in purpose and *function*. This theoretical work, some of which is still useful, was based on my doctoral research at the University of California at Berkeley and at Harvard University, and is synthesized in my dissertation, *Thinking Maps as Tools for Multiple Modes of Understanding* (Hyerle, 1993). The book you have in your hand is also grounded in the sequel *A Field Guide to Using Visual Tools* (Hyerle, 2000a), a compilation of more practical examples from the field that included excerpted writings and stories from many educators, parents, and businesspeople who had created novel applications of visual tools. The work also showed, in explicit terms, how each of these different tools was used and gave examples from classrooms and publishers.

In this book, I have included excerpts from many of these sources and expanded the “overview” synthesis pages for many of the tools so that teachers can try out the tools with students as a starting point to move from isolated uses to more comprehensive, schoolwide uses of visual tools. These overview pages include a model document that is an exemplar of how to take the tool into practice, but I have

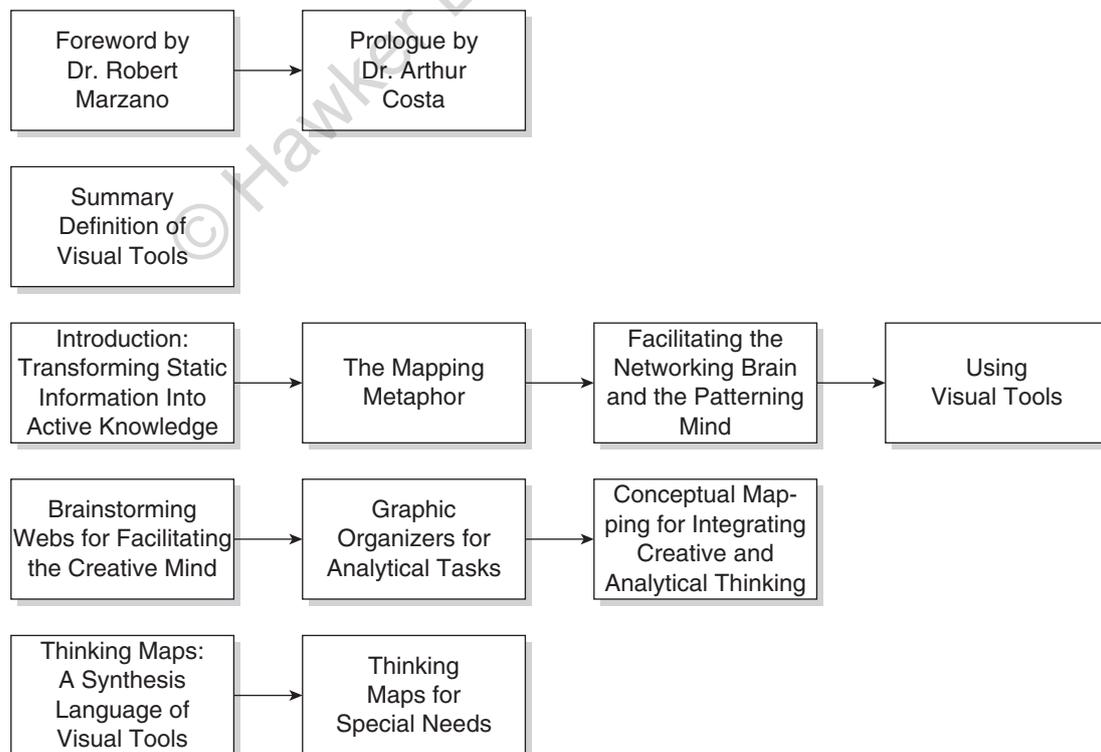
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\*Many isolated, generic forms of visual tools presented in this book have been used by educators and businesspeople for generations. When a developer or researcher of a set of visual tools, or visual tools software, and / or a language of visual tools that requires specialized techniques, resources, and training has a registered copyright, I have used the appropriate symbol that legally and professionally recognizes their work, and I hope that readers will investigate and honor these distinctions.

not provided blackline masters for duplication. Why not? I have learned from over 20 years of experience with visual tools of every kind—and I have tried most of them with students—that if you have to duplicate a blackline master for students, you are asking them to duplicate your pattern of thinking, and not draw out and construct their own. I also have learned from my own experience and from observing other educators that we often *severely* underestimate students' capacities. This occurs especially in those schools and classrooms where teachers are working with students who land in the lower quartiles of testing and those with special needs. For many different and complex reasons, many educators end up coddling and thus inhibiting these students' cognitive development, rather than explicitly mediating their thinking toward high levels and into their own zone of proximal development (Vygotsky, 1936/1986).

This book is most easily understood as having three stages. The first three chapters, as shown in Introduction Figure 2, introduce you to, respectively, the metaphor of mapping, the research on the effectiveness of visual tools, and three types of visual tools, including general guidelines for using them. Chapters 4, 5, and 6 focus in on three basic types of visual tools, with pathways for applying them: brainstorming webs, graphic organizers, and conceptual mapping. The final two chapters document the now extensive use of a synthesis language of visual tools I developed, called Thinking Maps. Chapter 7 introduces Thinking Maps and then reveals how these tools, as a language, have been used successfully for English-language learners, for Mapping the Standards, and for leadership practices across

**Introduction Figure 2** Flow Map of Book



whole schools. After my introduction to the tools, three authors—Stefanie Holzman, Sarah Curtis, and Larry Alper, respectively—give us insight into these three applications. The final chapter documents how a school in West Newton, Massachusetts, Learning Prep School, with elementary through high school students and all with language-based special needs, has fully implemented Thinking Maps over multiple years. The well-documented results show changes in students' cognitive development, performance on classroom tasks and the Massachusetts Comprehensive Assessment System (MCAS) test, as well as profound shifts in how these students *see themselves* as learners through the differentiated uses of Thinking Maps.

This last chapter, written by Cynthia Manning, Coordinator of Thinking Maps at Learning Prep School, is a testament to what can happen when a whole school faculty explicitly and systematically, with coherence and sustained effort, delivers to their students a visual language for learning based on fundamental cognitive processes. One student is quoted as saying that these tools “get me to think.” The demonstrated successes described in detail in the final chapter reverberate back across the book as the effort and outcomes portrayed heighten the central premise of this book: empowering students at every level to transform *static* information into *active* knowledge. These visual tools offer direct pathways from lower-order applications to higher-order thinking, from remembering content information to transforming information into conceptual understandings, from being able to map out and write transitional sentences in an essay to envisioning and planning students' dramatic transition from school into the often daunting new world requiring self-knowledge.

The students who are quoted in the last chapter represent the vision of this book: showing how visual tools are enabling students to take control of their own thinking and actions so they can transform information into knowledge that, in turn, leads to these same students' being able to transform the daily journey of their lives into a continuous process of self-knowing and renewal.

# The Mapping Metaphor

**T**eachers around the world are often mystified by the mismatch between their perceptions of students' thinking and classroom performance. These perceptions may be positive, as offered in the following statements you may have heard yourself say:

- "I know that he has great ideas, but he can't seem to get them out in his writing! His writing is always a jumble."
- "She has amazingly creative ideas but has a very hard time articulating them."
- "I give my students the information, but when they come back with it—if they can remember it—it's a disorganized mess! They are smart, but they simply don't know how to organize their ideas."
- "I tell them the steps, and I know they can do it, but they often have to be told over and over again to get it right."

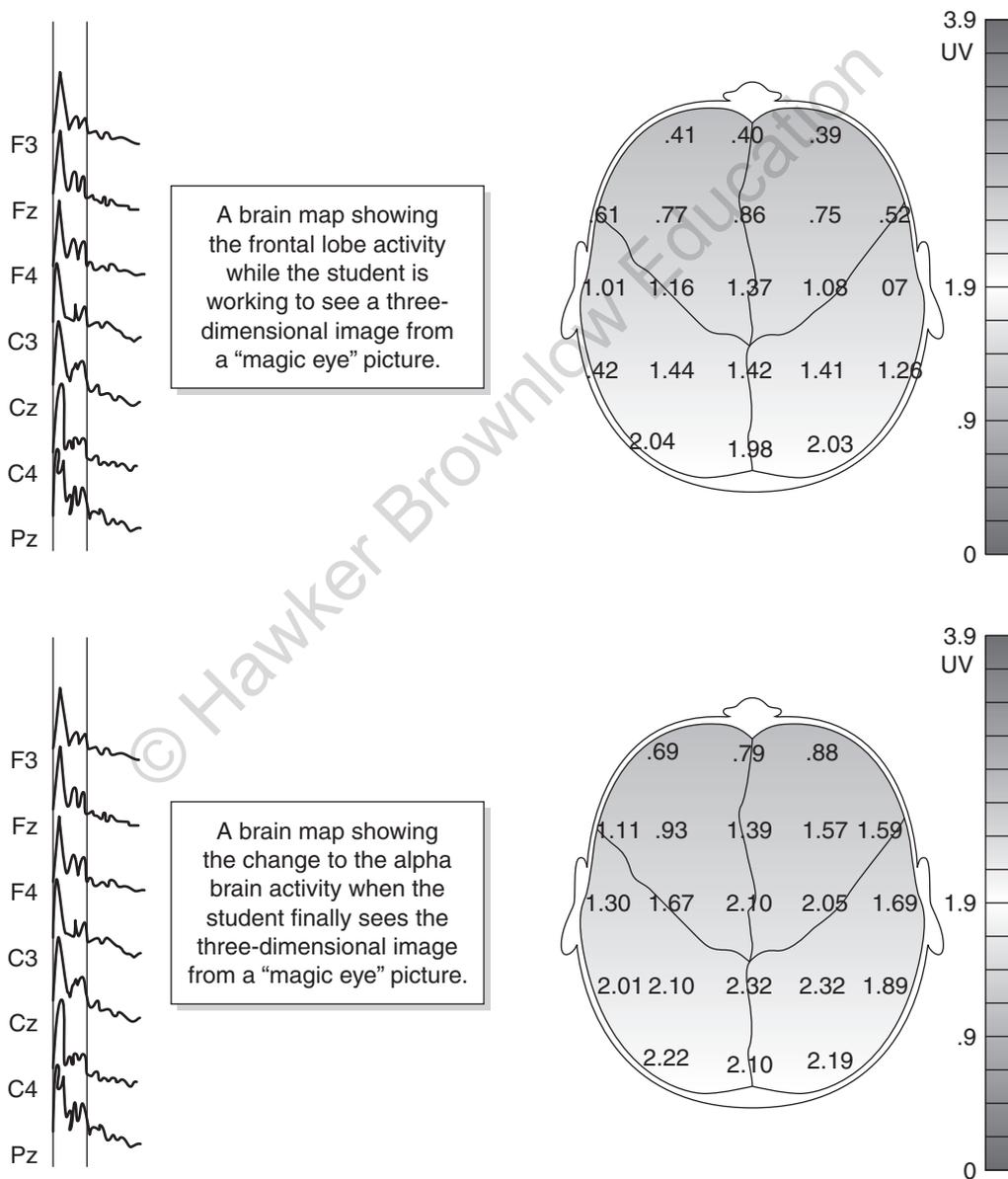
The perceptions may also be dangerously negative and detrimental, as some educators work from a deficit model, especially with students of color, students who are learning English as their second language or discourse (Mahiri, 2003), and students who come from families living in poverty. Here are some examples that I have heard over 25 years of working in urban schools with a high percentage of children of color, many of whom also live in poverty:

- "These children just can't think."
- "I ask them to tell me what they are thinking and they just don't say anything. I ask them to write and the words are a jumble."
- "Well, you know, look where these children come from. They just don't have the prior knowledge to make it."
- "How can they think if they don't have any vocabulary?"

## MAPPING THE BRAIN

In early studies of the brain, scientists saw two *hemispheres* linked by a bridge; next, *regions* of the brain, specific *locales*; and then the detailed system of neural networks. Figure 1.1 shows how even back in the early days of brain scans, the understanding of brain functioning depended on visual mapping of the contours of activity. In this example, a special camera called a “magic eye” was used for scanning brainwave activity in different regions of the brain.

Figure 1.1 Mapping Brain Activity



Source: Alcock, M. W. (1997, Spring). Are your students’ brains comfortable in your classroom? *Ohio ASCD Journal*, 5(2): 13.