

# Preface



## The Brain-Targeted Teaching Model

Since the publication of my first book, *Connecting Brain Research With Effective Teaching: The Brain-Targeted Teaching Model* (Hardiman, 2003) much has changed in the landscape of educational neuroscience or *neuroeducation*, an emerging field at the intersection of the brain sciences and education. Research in the neuro- and cognitive sciences has produced numerous findings that educators have increasingly viewed as important to expanding their understanding of how children learn. Like professionals in other emerging “neuro” fields—neurolaw, neuroeconomics, neuroaesthetics, neuroethics—many educators seek to not only become familiar with the advancing knowledge of human cognition and learning, but also to understand how this knowledge can inform their work.

Currently, research from the scientific community that is *specifically intended* for teaching audiences is scant. Still, promising findings from neuro- and cognitive science research in areas such as attention, memory, emotions, creativity, executive function, sleep, and exercise continue to expand our understanding of cognition and learning and can directly inform how teachers and educational policymakers craft the educational experiences of students at all ages. This growing knowledge, however, creates the need for translation of relevant research findings to determine appropriate connections to educational practice.

## WHO SHOULD READ THIS BOOK

This book is intended to serve as a bridge between research and practice by providing any educator with a cohesive, usable model of effective instruction informed by educational research as well as findings from the neuro- and cognitive sciences. The research and instructional strategies presented are designed to be relevant to a wide range of educators, from early childhood practitioners to higher education faculty. Examples of practical applications of research span various subject areas and extend from early elementary grades to college classrooms.

For educators at any level, it is critical that relevant research on cognition and learning be approached systematically and realistically, rendering a better understanding of the developing child and adult learner, greater precision in instructional techniques, and enhanced educational outcomes for students. It is also important that the growing attention on *brain-based learning*—a term often used to refer to learning that uses strategies that are based in research in the brain sciences—does not generate just another short-lived initiative.

In my own work as a school principal in an urban school district and now at the university level, I have found that too often teachers are

handed an ever-changing array of initiatives and programs that rapidly come and go. Well-meaning educational leaders may not understand how this serves only to dilute teacher effectiveness rather than support it. Teachers may “wait out” one initiative in hopes that a better one will come along or feel confused as they try to meld a new program with the previous one. Accordingly, without a cohesive classroom-based model, teachers may easily be confused by the plethora of instructional strategies that claim (some appropriately, some not) to be based on research from the brain sciences. Usable knowledge may be confounded with myths that divert teachers’ time and waste valuable resources.

## THE CENTRAL PURPOSE OF THIS BOOK

### *A PEDAGOGICAL FRAMEWORK—THE BRAIN-TARGETED TEACHING MODEL*

The basis of this book is to bring relevant research from the brain sciences to educators through a pedagogical framework, the Brain-Targeted Teaching (BTT) Model (Hardiman, 2003). The model provides teachers with a cohesive structure for interpreting research findings from the neuro- and cognitive sciences and applying them to their own practice. Teachers who have adopted the model as a guide for planning and delivering instruction have recounted how it has enhanced teaching practices ([www.braintargetedteaching.org](http://www.braintargetedteaching.org)), and preliminary research has demonstrated its efficacy (Bertucci, 2006).

The BTT Model is neither a curriculum nor a marketed product. Rather, it is a way to plan effective instruction informed by research from the neuro- and cognitive sciences and research-based effective instruction (see Marzano, Pickering, & Pollock, 2001). It was designed, in part, from the thinking skills frameworks of Dimensions of Learning (Marzano, 1992), Multiple Intelligences (Gardner, 1983, 1993), and Bloom’s Taxonomy (Bloom & Krathwohl, 1956). Important, however, to the development and expansion of the model is the emphasis of translating and applying findings from recent and ongoing scientific research.

The model presents six important domains, or “brain targets,” of the teaching and learning process. These include the following:

- Brain-Target One—Establishing the emotional climate for learning
- Brain-Target Two—Creating the physical learning environment
- Brain-Target Three—Designing the learning experience
- Brain-Target Four—Teaching for the mastery of content, skills, and concepts

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- Brain-Target Five—Teaching for the extension and application of knowledge
- Brain-Target Six—Evaluating learning

The BTT Model, which originated as a grass-roots school-based program in Baltimore, Maryland, is now informing educators across all grade levels from California to Greece. The model took root and expanded during my tenure as a principal of a large school serving children in Grades K–8. As our faculty looked to expand the school’s approach to instruction, we sought ways to meet the demands of high-stakes testing while also providing an educational program informed by the latest research on how children best acquire, retain, and apply knowledge. At the same time, as part of my doctoral studies at the Johns Hopkins University, my inquiries led me to examine and make sense of findings from the explosion of research from the brain sciences during the 1990s, the “Decade of the Brain.” Although the number of studies conducted in school settings was (and still is) quite small, I applied usable knowledge from the neuro- and cognitive science to develop a model of effective teaching.

From its original inception at Roland Park Elementary/Middle School, the model continues to evolve thanks to the dedicated work and experiences of teachers regionally and nationally who received training at workshops and conferences or through study in graduate work in the Mind, Brain, and Teaching Certificate at Johns Hopkins University School of Education. Based on their experiences, teachers (from K–12 to higher education) have shared how the model helps them to conceptualize activities that tap into students’ creative thinking and imagination by focusing on problem-solving and application of content to real-world contexts. Teachers also have recounted how meaningful integration of the arts into learning activities leads to heightened student engagement and greater retention of content. From our first experiences in 2004 to now, the framework of the BTT Model has assisted teachers in using relevant knowledge and research from the neuro- and cognitive sciences to inform the design of instruction to promote students’ connection to learning, creative thinking, and deeper learning—all important outcomes for 21st-century learning.

## SPECIAL FEATURES OF THIS BOOK

This book reviews research from the neuro- and cognitive sciences, discusses how the findings can inform educational practice, and shares classroom activities from many teachers who have used the model in their

classrooms. It begins with a consideration of current educational practices and how the emerging field of neuroeducation can promote educational reform toward the goals of “21st-century skills,” which explicitly call for teaching all students to become innovative and creative problem-solvers. It then examines themes from neuro- and cognitive science that educators should know, including discerning the differences between meaningful uses of research and common misapplications of findings, known as *neuromyths*. Next, in order to help with understanding of research in subsequent chapters, the book provides fundamental information of how the brain works, including its structure and function. Chapter 3 provides an overview of the BTT Model, and the chapters that follow focus on each of the six brain targets, including research supporting the target as well as concrete examples of applications from practicing teachers—referred to as “expert teachers” throughout the book. We end by considering how the model can be used as a unifying framework in a school, how it aligns with standards and programs in place in many schools, and the various ways it can be implemented within any curriculum or school-based initiative.

Finally, it is important that I explain why I find the concept of “Brain-Targeted Teaching” (a description I coined in the last book) to be more useful than the term *brain-based learning*. A number of people have justly criticized the use of the term *brain-based* as an adjective describing learning. The silliness of the term is exemplified by the question, “Doesn’t all learning occur in the brain? . . . After all, we don’t think with our feet!” I concur that labeling learning as “brain-based” seems uninformative as all learning indeed occurs in the brain. In contrast, all **teaching does not result in learning**; so, while all learning is “brain-based,” all teaching is not. Accordingly, I wanted to focus on how *pedagogy* can be informed by knowledge of how the brain learns—how people perceive, process, and remember information. Therefore, the term *Brain-Targeted Teaching* seemed particularly apt.

Research from the brain sciences has demonstrated that the essence of learning is about biological changes. In view of that, focusing on the *science of learning* should be as central to discussions about education as the focus on accountability for the *product of learning*. It is time that policy and practices for schools of the 21st century reflect a focus on the way students think and learn. The emerging field of neuroeducation and the BTT Model can be the linchpin in this work.