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# Introduction

There is the cartoon about the little boy who brags to his friend about how he has taught his dog, Stripe, how to whistle. Subsequently, he replies to the "Doubting Thomas" friend, who points out that Stripe is not whistling, "I said I taught him. I didn't say he learned it." To the authors, this picture is worth a thousand words, as the saying goes. It epitomizes the entirety of the teaching/learning process. Teachers teach! But students must learn! These are two very different sides of the same coin.

This book is part of a two-book series. The first book in the set is entitled *Nine "Best Practices" That Make the Difference* and focuses on the teaching part of the teaching/learning process. This book, *Twelve Brain Principles That Make the Difference*, focuses on the learning part of the teaching/learning equation.

More specifically, this book is about how the brain learns best and all the things teachers can do to facilitate the learning part of the teaching scene. This "Nutshell" presents a unique organization of Renate and Geoffrey Caine's twelve brain principles. The twelve principles are arranged in four specific quadrants as shown in Figure Intro.1. Each quadrant speaks to a particular aspect of the high-achieving classroom and highlights how instructional decisions are governed by the twelve principles.

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| Climate *for* Learning | Skills *of* Learning |
|---|---|
| Challenge/Threat<br>Emotions/Cognition<br>Focused/Peripheral | Parts/Whole<br>Spatial/Rote<br>Parallel Processing |
| Interactions *With* Learning | Learning *About* Learning |
| Physiology<br>Brain Uniqueness<br>Social/Experience | Meaning<br>Patterning<br>Conscious/Unconscious |

Figure Intro.1. Four quadrants of brain principles.

Quadrant 1 addresses the environment for learning, stressing both the emotional climate and the enriched environment. This quadrant includes three complementary principles that foster a climate for optimal learning: Principle 1 addresses the concept of challenge engaging the mind; Principle 2 discusses the link between emotions and cognition; and Principle 3 highlights the learning environment and its role in the focused attention and peripheral perception of students.

Quadrant 2 speaks to the standards of learning and the context, content, and process skills for which each k-12 teacher is accountable. Embedded in the concept of necessary concepts and skills for various grade levels or disciplines are the three accompanying principles: Principle 4, which notes that the brain learns part and wholes simultaneously; Principle 5, which documents the rote and spatial memory systems; and Principle 6, which discusses the role of the brain as a parallel processor. All three of these principles speak to the teaching techniques that foster memory and learning.

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Quadrant 3 encompasses the concept of hands-on learning that is constantly and continually facilitated as an integral part of any lesson. Included in this quadrant are three principles that dictate ways needed to address the eager learner: Principle 7, which highlights the need for being aware of the entire physiology in the learning setting; Principle 8, which acknowledges the difference in the structure and chemistry of each and every brain and pushes the implications of that diversity for classroom teachers; and Principle 9, which explores the concept of the social brain and how it learns easily when embedded in experiences. All three of these principles inform the practice of hands-on learning.

Quadrant 4 focuses on reflective thinking and how the brain makes meaning, stores information, and retrieves needed memories. Again, three principles make up the essence of this quadrant. Principle 10 clarifies the nature of the brain to seek meaning; Principle 11 discusses the role of patterning in memory and learning; and Principle 12 reminds the teacher of the need for processing time—down time—for the brain to complete its deep processing of new input. All three principles illuminate the idea of how the brain makes sense of the world. All three speak to the practices of the skillful teacher.

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