

SECOND EDITION

12
Brain / Mind
LEARNING
PRINCIPLES
in ACTION

RENATE NUMMELA CAINE
GEOFFREY CAINE
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Foreword by Arthur L. Costa

Developing Executive
Functions of the
Human Brain



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Preface

It seems to us that the time has come to weave together the compelling trends affecting education.

- The National Teaching Standards call for a new and more rigorous kind of learner-centered teaching.
- Programs such as the International Baccalaureate call for more rigorous standards for students.
- Technology is linking people as never before and is providing unparalleled access to information and knowledge that spans the world.
- And neuroscience, cognitive science, and our collective wisdom are joining forces and helping us to grasp the nature of any learner as a complex, self-directed, living system.

The book you are holding in your hands summarizes our passionate commitment to integrating all of the above trends as a way of shaping professional development and paves the way for a remarkably positive view of learning and education.

What does it mean to use more of one's brain and one's mind?

Many people answer the question in terms of memorizing more facts. But if neuroscience and cognitive science are to be taken seriously, then the brain governs much more than memory alone. The “brain/mind” deals with emotions, movement, creativity, immune responses, language, reasoning, planning, organization, and dreaming. It allows us to experience compassion, interconnectedness, peace, and uncertainty. Add to that the fact that context and experiences influence and shape the brain/mind so that human beings have the capacity to change their own brain by using reflection, expanding awareness, and altering behavior.

So the answer to the question calls for understanding that the body-brain-mind of every student constitutes an interconnected unity engaged in a dance between biology and the environment. It leads to the awareness that the brain is biologically designed to learn, and that natural learning is a matter of building rich neural networks. And every aspect of the process

engages the twin dynamics of perception and action and has an impact on how a person interacts with the real world.

Given that the functioning of the brain encompasses so much, what are the implications for educators?

The Caines have suggested that for education to be based on how people learn naturally, three essential elements need to be present.

- Learners need to be in a supportive yet challenging and empowering social environment that elicits their interests, purposes, and meanings. They call this environment *Relaxed Alertness*, and the first section of the book focuses on how to create relaxed alertness in any learning environment and why.
- Content and the standards need to be integrated in events and experiences that engage emotions, thinking, imagination, and more that have meaning for the learner. They call learning and teaching that engages rich, experiential environments *Immersion in Complex Experience*, and the second section of the book focuses on how to create these environments and why they are critical to effective education.
- Experience by itself is never enough. While students are immersed in rich, complex, dynamic experiences in an organic and natural way, it is up to the teacher to consistently encourage students to summarize, analyze, reflect on, demonstrate, display, and present for feedback what they are learning. They call this third element *Active Processing*, and the third section of the book focuses on how to process student experiences and consolidate critical knowledge for assessment and outcomes measured by real-world performance.

How do we get there?

As we thought about writing this preface, the four authors took time out to watch the movie *Indiana Jones and the Holy Grail*. We needed a metaphor for courage. Near the end of the movie, Indiana has to pass through various tests in order to get to the Holy Grail. During some very intense moments, he has to decipher the instructions by going beyond the script provided with the map. The one test that intrigued us the most was where “Indy” has to trust that a bridge, which is totally invisible, is in fact there. However, it doesn’t appear until he steps out as if it existed. He had to think, then he had to believe.

What this book has to offer will never be adequately understood or even be visible until you step out toward the practices we suggest to you.

We have to learn together.

In this interconnected, very demanding, technologically complex world, it is time for educators to emerge from the isolation of their

classrooms and their individual professional journeys. In fact, we strongly suggest throughout the book that mastering the new research and implications for instruction can only happen when those involved enter into dialogue and learning as a coherent community. This is why throughout the book we encourage the reader to learn in tandem with at least one other person or, better still, in what we call process learning circles.

Today's world requires that we make use of the knowledge and information already in our communities even as we reach out to other experts and the world.

There is a need for leadership that empowers others.

- Getting there requires leadership that empowers. We fully understand the power and need for great leadership. If you are an individual who can encourage, inspire, and support others in excellence and personal and professional growth, then we encourage you to step up to the plate. Whether you are a teacher leader, administrator, support staff, or superintendent, we call on you lead the way by demonstrating the qualities that lead others to doing their best.

Where has this been done?

Exceptional schools, teachers, and leaders exist everywhere, but those who have put this book to the test are very special to us.

- For the past eight years we (the Caines) have worked with a leading-edge, state-supported program of educational reform called "Learning to Learn" in Adelaide, South Australia. Credit for their success goes to everyone involved, but especially their project manager, Margot Foster. The program truly reflects the kind of commitment to organic learning and teaching we speak of.
- All four of us continue to work with a wonderful academy for high school students—the Macomb Academy of Arts and Sciences in Armada, Michigan. The academy is the lynchpin in a major federal grant with two other districts. Again, this school is led by many but much credit goes to their director, Elsie Ritzenhein, a truly outstanding leader.
- One of us (Karl J. Klimek) directs and oversees the implementation of grants by the Convergence Education Foundation (formed by industry and businesses that support educational change in a tristate area in the Midwest). The programs, the projects, the teaching, and the leadership stimulated by those grants are truly outstanding.

- One of the most fascinating experiences for us at Caine Learning has involved our associate and head of home schooling, Andrea Bond. Andrea has led our small community of home schoolers and has applied our theory and practices in her work with her son, Tobin. As she will tell you, the evidence is in. In her words, “it works.” And seeing Tobin, her remarkable 7-year-old, practice his writing with complete engagement and passion in a local restaurant helps us to see the possible results every parent would wish for their child.

WHAT IS NEW IN THE SECOND EDITION?

Anyone referencing the neurosciences in their writing these days needs to keep pace with new research. Accordingly the research sections in every chapter have been updated. For instance, we introduce findings on what are called “mirror neurons” to further support the principle that the brain/mind is social. There is more about plasticity—the capacity of the brain to change as a result of experience, and neurogenesis—the ability of the brain to regenerate itself. The research on the executive functions has been updated and incorporates Joaquin Fuster’s work on how the brain shapes itself through experience, engaging both perception and action.

Now, more and more, we refer to the overall process as “Natural Learning.” With some colleagues we have also cofounded a new nonprofit called the *Natural Learning Research Institute* (naturallearninginstitute.org). Its purpose is to engage in long-term reform efforts with schools and districts, to research the results, and to disseminate the findings to as wide an audience as possible.

Former readers will enjoy the new clarity and organization. Because there are a rather large number of new or unusual terms, there is a vocabulary section at the end of every chapter. We have changed our leadership section to “The Empowering Leader” because it better describes what we mean by leadership. The sections on leadership at the end of each chapter have been substantially revised. The resource on “How to Develop Process Learning Circles” has been expanded, and new stories and “global experiences” have been added.

You will find other changes in organization and headings that we hope will make the book much easier to read and share with others.

We hope that this new edition reflects our own learning and journeys with our colleagues and associates through the projects in which we have been involved. We conduct more and more trainings on the principles using the process learning circles every year. You may want to join us and become an associate. We love hearing from you so e-mail us at info@Cainelearning.com.

We owe thank-yous to many individuals, including those mentioned in the first edition.

In particular we want to thank associates of Caine Learning, who dwell in places ranging from Singapore to Germany and all over the United States. We can honestly say that we have never known more dedicated, remarkable educators, and we are delighted that their number is growing.

We owe thanks to the neuroscientists and educators who continue to share their research and especially those who have become advisors to the *Natural Learning Research Institute*, including Joaquin Fuster of UCLA; Elkhonon Goldberg at *The Institute of Neuropsychology and Cognitive Performance*, New York; Lynn Nadel at the University of Arizona; Louis Cozolino of Pepperdine University in California; David Drew at the Claremont Graduate University in California; Robert Sylwester, Professor Emeritus, University of Oregon; and William Spady, prolific author on leadership and Program Director of the newly formed New Possibilities Network.

We once again want to thank Dick Debbertine for his technological support and willingness work with our ideas. For instance, he has recently developed a wonderfully innovative and safe approach to working with the Internet. It allows teachers more control and students more possibilities when engaging in the Guided Experience Model.

And finally we want to acknowledge and thank the many educators, parents, policy makers, businesspeople, and others with whom we have connected and shared ideas and, in many cases, action. The time has come to ground education in the amazing natural capacities with which every human being is endowed. And we are proud and delighted to be participants in this collective call for change.

LEARNING CAPACITIES

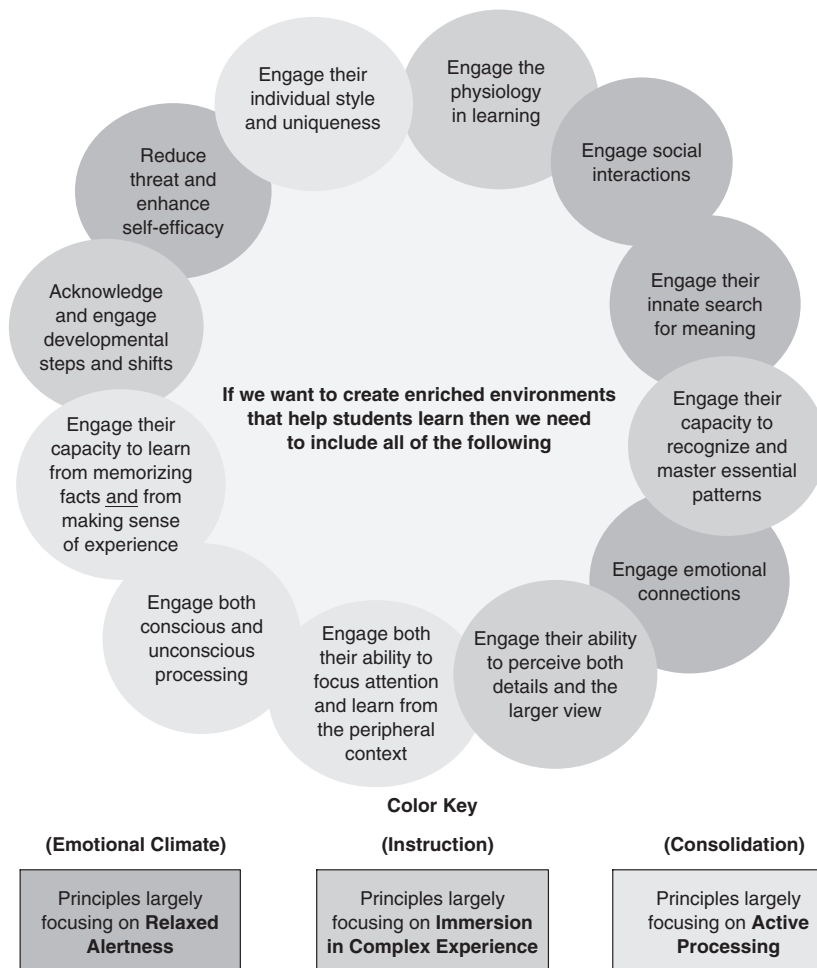
How do educators implement the principles? To begin with, the principles tell us that every learner has immense and specific capacities for learning that teachers can and must address. In essence, learning based on biology is *natural*.

For example, the fact that “The brain/mind is social,” tells us that every student has the capacity to learn through relationship with others. It supports cooperative learning, peer coaching, and having students share their work and ideas with others.

Although students will differ based on their background and genetic and physical makeup, all students can learn more effectively if their innate capacities are seen as natural, and are acknowledged and addressed in teaching.

Brain/Mind Learning Capacities Creating an Enriched Environment for Learning

According to Brain/Mind Learning Principles all learning engages the following. Our job is to orchestrate learning so that as many aspects of learning are engaged as possible.



Translating the principles into capacities for learning leads to suggestions for teaching.
