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# Getting Started 1

**F**irst and foremost this book is about you as an educator. You have an immense power to influence the students who are in your world. Neuroscientists are telling us what we as educators have known intuitively. Energized by biology, experience, and culture, students literally learn from everything that touches their lives. If we take this research seriously, then we understand that with this expanded view of learning, education is never just about memorizing facts and passing tests. Our entire culture teaches, and like parents and family, educators have the chance and responsibility to influence the course of a life. So in the end, it is *your* intelligence, compassion, patience, and subject matter knowledge as an educator that all act together to influence and shape students. With this new understanding of learning, the line between academic and life skills becomes blurred.

The human brain/mind is much like a dynamic kaleidoscope, and we are beginning to see that what this generation of students is learning beyond the classroom is unlike anything past generations have experienced. All too often educators find themselves stretched between the world of the past and the world of the present and future.

Like cautious pioneers, educators search for guidelines and signposts that tell them where they are going. Many educators are working to the point of exhaustion, only to find their efforts undermined by forces beyond their control. Because they feel lost at times, entities of all kinds have stepped in to tell them which way they must go. But those entities are not present in schools and classrooms on a daily and yearly basis. It is easy to believe in certainty when not confronted with the immediate and immense complexity that represents students' learning from everything that is connected to living in today's world.

One major struggle is between those who advocate schools that confine teaching largely to "the basics" and those advocating a more creative, student-centered approach. Advocates of the basics are committed to streamlining all teaching so that every child leaves school with essential facts, information, and abilities necessary for functioning as an adult. They do not trust that student-centered learning can lead to the type of mastery they see as critical to providing success in a specific discipline and in life.

Advocates of the student-centered approach would add that they too want to help students succeed and master facts, information, and skills essential to academic disciplines (McCombs & Miller, 2009). But they would hasten to add that the brain learns best when attention and motivation are present and that real learning also must be exciting and meaningful. Most important of all, these educators tend to be convinced of the critical role that relationships and community play in learning. Research from the neurosciences and research on learning in general is shedding light on this debate.

## **TODAY'S STUDENTS ARE NOT THE SAME**

Traditional teaching and schooling are based on beliefs and values that emerge out of the past.

Perhaps most important is the belief that parents are readily available to guide the child's development of higher-order thinking. Higher-order thinking includes many sophisticated capacities often attributed to what are known as executive functions of the brain. When mature, these functions include impulse control and self-regulation, abstract thinking, planning, and decision making, among others. It tended to be assumed that parents were close by, and it was they who could see the future and plan ahead. They were there to set goals for their children and make certain that they attained those goals. It was the parents who made certain that their children studied because "someday" they would need to know everything taught in school. The ability to think that far ahead is a cognitive function that is not available for most children; caring adults were supposed to be responsible for that. Parents were supposed to be the ones who taught their children to "not put off 'til tomorrow what you can do today" and to help children understand that learning takes time and that occasional problems are natural and can be overcome. Ideally, parents engaged their children in questioning and discussions and worked with knowledge students acquired on a daily basis. They made certain that homework was completed.

Although skills that make use of executive function (hereafter also referred to as higher-order thinking skills or higher-order functions) always have been seen as critical, the experiences that help students learn how to make decisions, apply knowledge to personally relevant questions and projects, reflect on their own thinking and accomplishments, and use critical thinking and feedback from others may well be lost in an age of instant information. The world of children growing up in the Information Age is profoundly different from that of many readers of this book—and of most current parents and educators.

In the past, the entire pace was slower, and most importantly, most adults were in charge of information.

Clearly, many families did not meet the ideal, but there were social structures of which most children were a part that were believed to provide a basis for maturation and development of the capacity to make important, real-world decisions.

In recent times conditions have changed dramatically. Less than one-third of families now eat together. Approximately 46% of kids grow up in a single-family household and 87% of both parents work full or part time (America's Children, 2012). So who or what is teaching critical life and decision-making skills to students?

The average student watches between three and four hours of television a night, most of which is not discussed or talked through with input from a knowledgeable and mature adult. Computers, video games, and movies add to time spent away from school (Healy, 1998). According to the Kaiser Family Foundation (Rideout et al., 2010), 71% of all 8- to 18-year-olds have TVs in their rooms, and 50% have video game players as well. The number of kids who have VCRs or DVD players is up from 36% to 54%:

Those with a TV in their room spend almost 1½ hours (1:27) more in a typical day watching TV than those without a set in their room. Outside of their bedrooms, in many young people's homes the TV is a constant companion: nearly two-thirds (64%) say the TV is "usually" on during meals, and almost half (45%) say they live in homes where the TV is left on "most" or "all" of the time, whether anyone is watching it or not.

"These kids are spending the equivalent of a full-time workweek using media, plus overtime," said Vicky Rideout, MA, a Kaiser Family Foundation vice president who directed the study. See *Natural Learning for a Connected World: Education, Technology, and the Human Brain* (Caine & Caine, 2011) for more statistics.

The problem with this entire scenario is that the amount of information, gaming, and so on has reached new heights at the same time as much information and almost an infinite number of "facts" and opinions and events reach our children. At the same time, they are rarely asked to think critically, analyze content, evaluate what is happening, or make their own intelligent decisions. Rarely are they challenged to think through a particular point of view, scenario, or action seen or experienced. Unless they are in a close relationship with an adult who engages their minds by questioning their conclusions, who helps them resolve personally relevant issues, or who helps them see the consequences of their adopted beliefs, our students are left with facts that are not tied to real-life experience or consequences.

If parents do not engage children in thinking, teachers tell them only facts but don't tie the facts to the children's own experiences, television doesn't have them think and analyze, and video games provide excitement without reflection, where exactly do we expect them to develop the kinds of skills that help students develop higher-order thinking skills (described as executive function) and prepare them to become responsible, thinking adults living and working in a technology-saturated world?

Educators also have to come to terms with the fact that this is the Information Age, and information is available everywhere. Education that still focuses primarily on memorization is terribly inadequate. Any search engine (e.g., Google) will scan the World Wide Web instantaneously on any subject. Type in a line from a poem, and the search engine will provide the name of the poem and the author. Type in the author's name, and it will provide the author's other works and biographical data. *Almost anything a student needs in the way of information can be found on the Web. Learning that focuses predominately on facts and information must transition into more sophisticated processes that require the use of that information for relevant goals and purposes.*

Educators have to understand how to create classrooms and processes that employ the whole brain, from utilizing creativity, facts, and skills to developing healthy human relationships and working with time lines, logical procedures, and intelligent application. This kind of learning requires the use of higher-order thinking (one's executive functions). These abilities are not separate in the brain. Neither should they be separate in education.

## HOW THIS BOOK IS ORGANIZED

The book is based the 12 Brain/Mind Principles of Natural Learning and is organized according to three instructional elements that emerge out of these principles. Part I introduces Relaxed Alertness as an optimal state of mind; in part this is because without the appropriate social and emotional conditions for learning, students will not take the risks required by the kind of teaching we advocate. Part II focuses on Immersion in Complex Experience, which focuses on creating challenging environments for learning, and Part III is organized around Active Processing, which includes both instant and ongoing feedback and reflection.

## BRAIN/MIND LEARNING PRINCIPLES

Several people have asked us to spell out what we see as the most important changes for education. For us, the answer is clear. *We must understand how human beings learn and place that understanding at the very center of teaching.* This is far from easy, and the entire process is very challenging and also can be daunting.

To make sense of the vast amount of research that has been generated in fields ranging from psychology to biology and neuroscience, as mentioned earlier, the Caines developed a set of 12 Brain/Mind Principals of Natural Learning in their book *Making Connections: Teaching and the Human Brain* (Caine & Caine: 1991, 1994).

The principles are grounded in the view that a human being is a living system, every aspect of which interacts with other aspects in the learning process. *As a result, no one principle is more important than another. They are numbered for identification purposes only.*

Each principle has to meet four basic criteria:

1. *The phenomena described by a principle should be universal.* A brain/mind learning principle must therefore be true for all human beings, despite individual genetic variations, unique experiences, and developmental differences.
2. *Research documenting any one specific principle should be evidenced in, and its influence must span, more than one field or discipline.* Because a learning principle describes a systems property, one would expect it to be validated and confirmed by ongoing research that crosses multiple fields and disciplines.
3. *The principle should anticipate future research.* It should be expected and anticipated that research will continue to emerge that refines and confirms each brain/mind learning principle. For example, much of the brain research on the links between emotion and cognition was published after we first formulated our principles in 1990.
4. *The principle should provide implications for practice.* By their nature, principles are general, so they cannot be expected to tell educators precisely what to do. However, effective natural learning principles ought to provide, as a minimum, the basis for an effective general framework to guide decisions about teaching and help in the identification and selection of appropriate methods and strategies. The principles also illuminate new *capacities for learning*, which can be translated into further enhancements of instructional practices.

On the surface each principle seems to be obvious: for example, “The brain/mind is social” (Principle 2). But each principle is also a gateway to deeper understanding. This principle, for example, can help educators better understand the links between social relationships, brain development, and learning (see Chapter 4). The principles are not separate and discrete. Because they describe learning as a system’s property, each principle has a specific focus but involves aspects of the others. Most chapters in this book begin with a brain principle that summarizes research and current understanding about learning (see Figure 1.1).

## RETHINKING WHERE WE ARE GOING

The principles help us understand why it has been so difficult to agree on what it means to learn. They show the entire body, brain, and mind work together in learning. When different parts of the system are disregarded or some processes are ignored, then learning is affected.

Our goal in this book is to use what we call *natural learning* as the foundation upon which teaching and leading are built. Natural learning is what the principles explain—it is natural because each and every human being is biologically and psychologically designed to learn from life in the ways that the principles explain. So what is it that each of us does naturally when we learn? Here is our definition: Natural learning means making sense of experience and developing new capacities to act in an on the world.

We have to make sense of things. We are always looking for what experiences mean and what patterns can be detected because that process is critical to survival. And we have to then find new ways to act—that is the other element that is critical to survival.

All this provides the essential foundation for education: Education is the way in which every society helps its children (and others) make sense of their experiences and develop important tools for dealing with experiences and making things happen. To get there, the principles show that there are several processes involved. The problem is that they have been dealt with separately.

The key to effective educational renewal is to integrate those different aspects of learning into the way we teach. We need to see that what is generally aimed at is really part of something larger where all the different aspects play a part.

- For some, the primary aspect of learning is *memorization*, and the brain/mind is designed (in part) for memorization.
- For some, the primary aspect of learning is *intellectual understanding*, and the brain/mind is designed (in part) for intellectual understanding.
- For some, the primary aspect of learning is *making intellectual and practical sense of experience*, and the brain/mind is designed (in large measure) for making sense of experience.
- As more aspects of the principles are understood and implemented, the range of what is meant by student learning expands.

## **BRAIN/MIND LEARNING CAPACITIES**

Fortunately, the principles show that every one of us—every student, every teacher, every leader—has a set of great resources to help us along the way. Every principle is also the foundation of a learning capacity. Recognize and harness the capacities, and expert learning can happen.

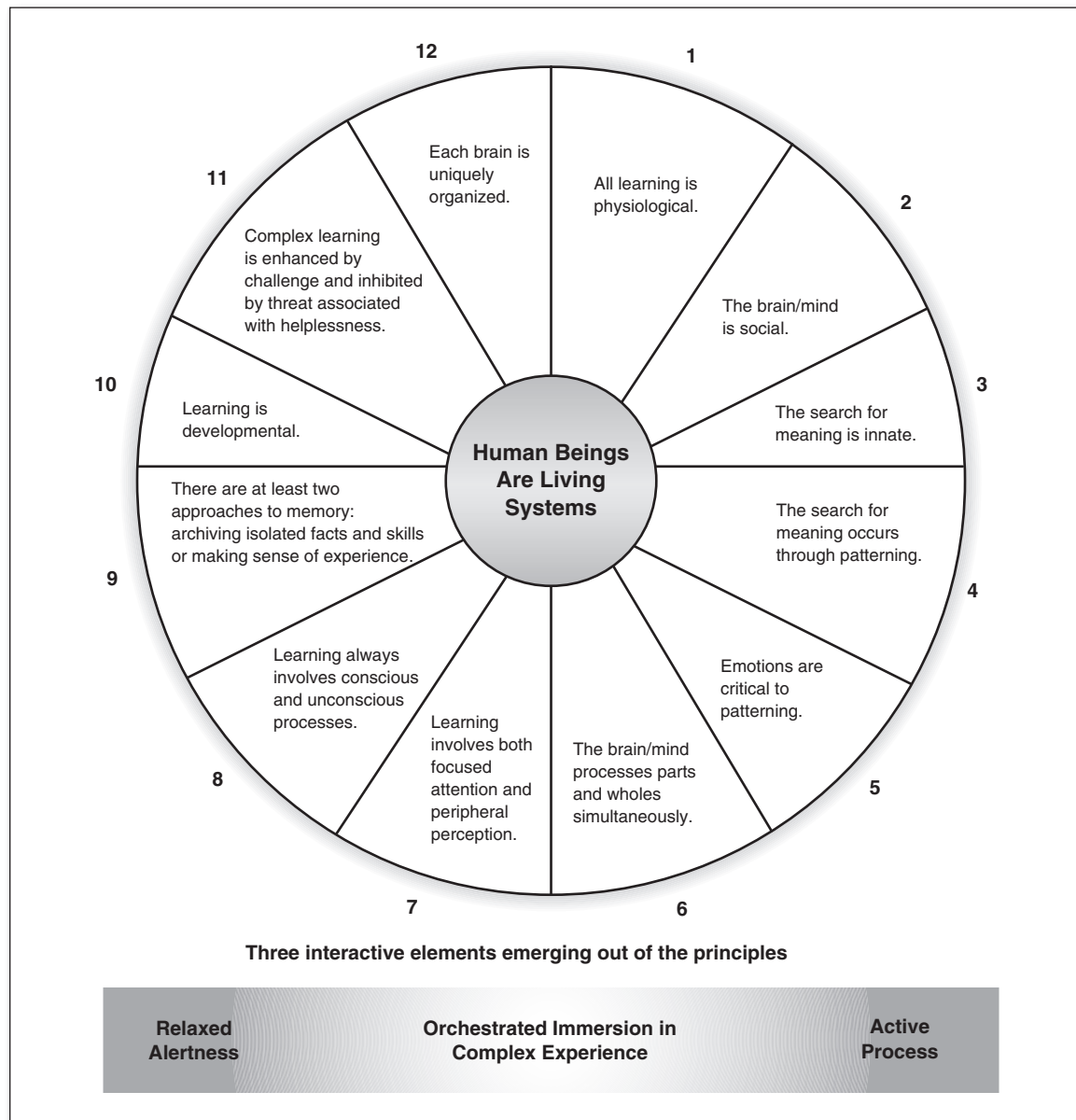
For example, the fact that “the brain/mind is social” tells us that every student has the capacity to learn through relationships with others. It supports cooperative learning, peer coaching, and having students share their work and ideas with others.

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

## **THE THREE CRITICAL ELEMENTS OF INSTRUCTION**

All of the principles and capacities suggest that there are three fundamental components or elements of great teaching. They are the foundation for professional development and must be mastered by teachers and understood

**Figure 1.1** The Brain/Mind Principles Wheel

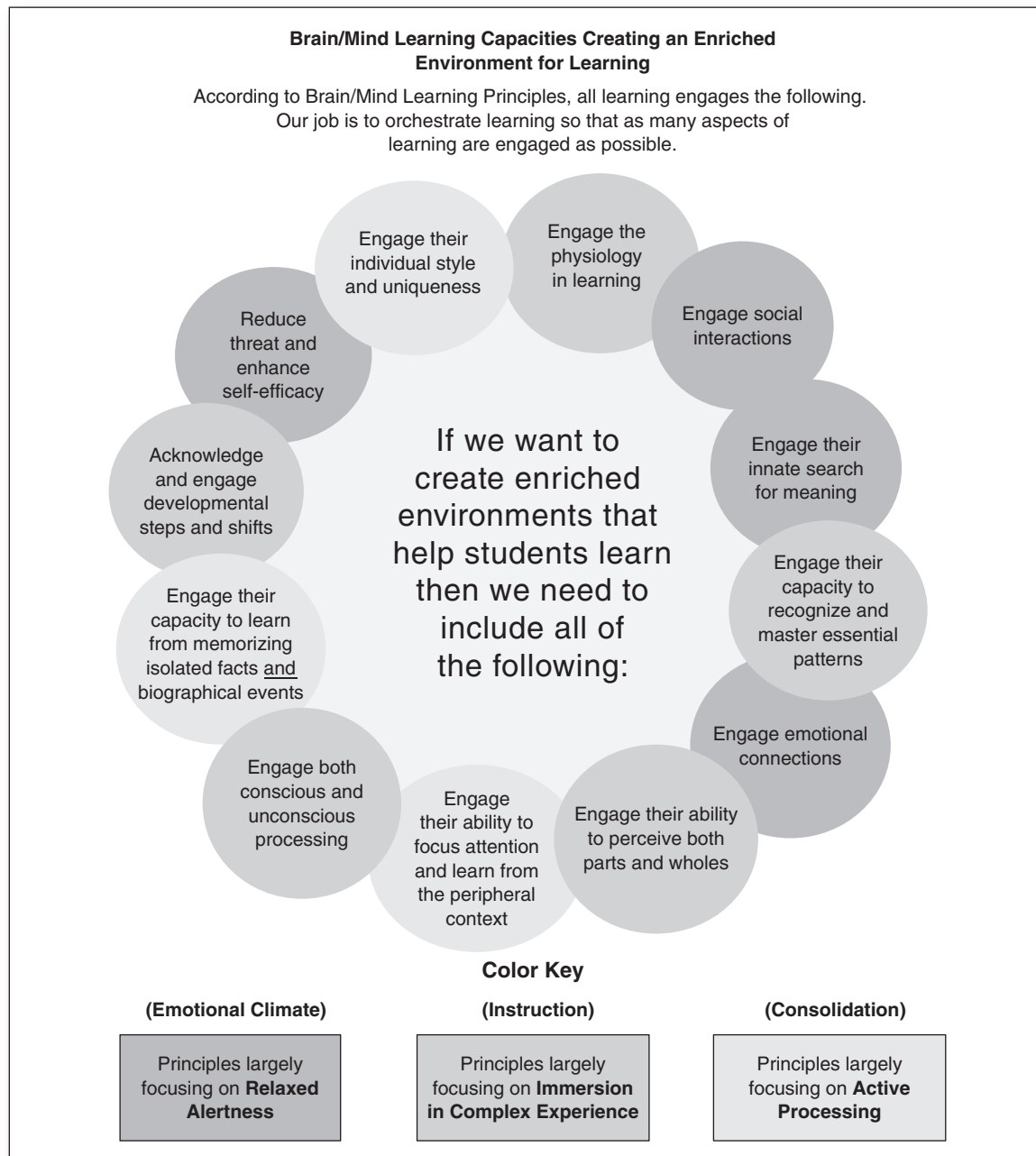


by all educators. We address each separately, but it is critical to understand that *each of these elements has a profound effect on the other two and is in fact never separate*. They were first developed in *Making Connections: Teaching and the Human Brain* by Caine and Caine (1991, 1994).

## **1. Relaxed Alertness: Creating the Optimal Emotional Climate for Learning**

Our motto is “Relationship, Relationship, Relationship.” Many problems with learning and student behavior can be traced back to this element

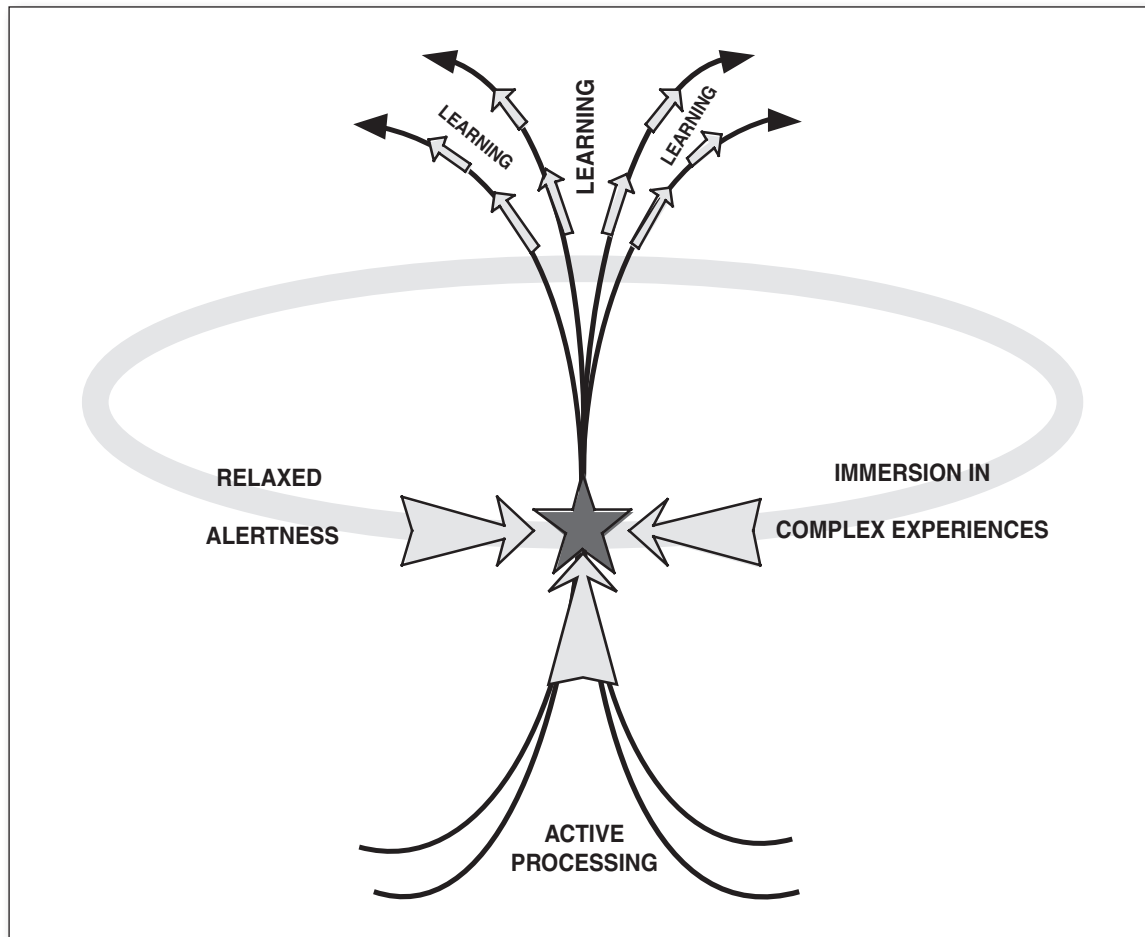
**Figure 1.2** The Brain/Mind Capacities Wheel



because the principles show there is an optimal emotional state for learning. It is affected and moderated by the fear and pleasure centers in the brain (Panksepp, 1998, 2004). We call this optimal state *Relaxed Alertness*. In *Making Connections* (Caine & Caine: 1991, 1994) it was defined as consisting of low threat and high challenge. This state exists in a learner who feels competent and confident and is interested or intrinsically motivated. Relaxed Alertness is also a state that is present in classrooms and learning environments in which emotional and social competence is the goal. *Such an environment allows all students ongoing opportunities to experience competence and confidence accompanied by motivation linked to personal goals and interests.*



**Figure 1.3** Optimal Conditions for Learning



## 2. Orchestrated Immersion in Complex Experience: Creating Optimal Opportunities for Learning

*The human brain learns through experience.* The brain's first contact with the world is through the senses. So learning must engage our senses of sight, hearing, smell, touch, and movement (to name a few). These are naturally activated by physical experiences the learner has with the world. At one level then, orchestration means that teachers provide experiences that have learners interact with knowledge in ways that are concrete and physical. Teachers can help students identify physical attributes of something by having students generate descriptions (what size, color, dimensions), create diagrams (draw something out to represent a physical or sensory experience), and create models (what examples are there that use the same basic attributes) of something they need to master.

*The brain learns by making connections between what is experienced and what that experience means to the learner.* Teaching therefore needs to require and invite learners to make connections to what is already organized and stored

in their brains. That happens when students are called on to relate and understand the new in terms of what they already know and care about. This is the basis for the acquisition of what could be called technical/scholastic knowledge—knowledge that is more traditionally academic. It requires students to grasp the what, how, when, and why of information based upon puzzles or dilemmas they encounter. It includes but goes beyond physical attributes of objects and fuels the search for explanations and understandings that are deeper and more complex.

*Ultimately the brain needs to “own” the learning by having the learner do something with what has been experienced.* This means that students need to be given the opportunity and at times be required to use the information to answer personally relevant questions, use new vocabulary, and solve problems and make things happen in relatively realistic contexts.

Because the brain/mind learns through experience, the teacher’s job is to create learning experiences and opportunities and to lecture only when appropriate. Experiences can be concrete or abstract in nature. All of the above—engaging the senses, making meaningful connections, and applying what has been learned—do not happen in a prescribed sequence. In any complex event (one that includes novelty or new elements that must be linked or connected in some way), we can expect all three to be happening simultaneously. In addition, this kind of teaching and learning engages what we will discuss in a moment as actor-centered, adaptive decision making (actor—the student; adaptive—related to a genuine problem). Actor-centered, adaptive decision making focuses on developing skills governed largely by the brain’s higher-order thinking skills, also known as executive function.

### **3. Active Processing of Experience: Creating Optimal Ways to Consolidate Learning**

The brain is better at remembering things that are of meaning to the learner. We are after performance knowledge—knowledge that the student can use. This goes far beyond standardized testing as it currently exists.

To fully capitalize on experience, there should be “in the moment,” ongoing instant feedback including practice and rehearsal as well as continuous reflection and discussion that solidifies and expands knowledge. We call this *Active Processing of Experience*.

This requires using teacher and peer questioning and feedback in the process of designing, interpreting, or applying knowledge. Students continually are required to think more deeply, identify specific characteristics and see relationships, analyze situations, think on their feet, utilize specific and basic skills, develop goals and time lines, make critical decisions, and communicate their understanding.

In fact, when Rumbaugh and Washburn (1999, pp. 201–202) report on their work with chimpanzees, which spans 25 years, their conclusions suggest that brain development appears to be optimized in chimpanzees under three conditions that mirror the three elements of this book:

1. They should be reared in a stable, supportive social context (Relaxed Alertness).

2. They should be immersed in a challenging environment as their “lifestyle,” not just for an hour a day. The environment should address the animals’ developmental needs with opportunities to “control” both their resources and activities (Immersion in Complex Experiences).
3. In addition, the environment should be structured so that the consequences of behavior or feedback are immediate, reliable, and relevant (Active Processing).

Although many teachers feel uncomfortable using research based on experiments with animals, such information is extremely important. Educators tend not to have the opportunity for controlled and long-term studies of this type. Animals, particularly chimpanzees, are also extremely close to humans genetically and share many characteristics with us.

Rumbaugh and Washburn (1999) also show that all chimpanzees reared in this way improved their ability to pay attention, to work with members of their social group, to improve memory, and to work “tenaciously on tasks/problems” (p. 202).

## THINKING AND LEARNING FOR A LIFETIME

What does it mean to use more of our brains? Although this is a daunting question, this book seeks to provide some answers.

All learning, from memorizing to mastering academic and technical skills, is important. Throughout this book we will, however, pay special attention to the development of skills and capacities attributed to a large extent to executive function. They are the key to reaching and sustaining high standards of learning and to raising those standards over time.

We can now go back to the definition of *learning* and add to it. If we want students to make sense of experience and develop new capacities, it is critical for them to *develop the ability to make good decisions in the real world. And these decisions are always based on the knowledge that they have and the sense they already have made of experience.*

### **Programming the Brain: The Almost Exclusive Reliance on Memorization of Facts and Skills**

Let us go back to the differing views of learning from the point of view of preparing students to make decisions. The place to begin is with learning defined in terms of mastering facts, skills, and procedures using memorization and repetition. This kind of learning has a quality to it that provides a comforting degree of certainty. It reduces things to right and wrong and serves as the bottom line for tests of all types. For example, a mile has 5,280 feet, a meter has 100 centimeters, the centers of the Moon and Earth are about 238,700 miles apart, and water is made up of two molecules of hydrogen and one of oxygen. There is no end to what we can

“know” or memorize, and all of it is critical to gaining expertise in any discipline. Vocabulary, grammatical rules, and knowing how to write for different audiences are all essential skills students must master. The brain stores much of this information in the way that a “programmed” computer might (Schmahmann, 1997).

In part, the brain does learn this way. The problem, as we have shown, is that this approach to learning and teaching leaves out too much. It also means that most of this information can be found on any search engine.

Learner-driven adaptive decision making versus veridical learning and decision making

Developing executive function or higher-order thinking skills cannot be done only through memorization and replication, and the brain/mind is not limited to being programmed by others. What the learner needs in addition is the opportunity for actor-centered, adaptive decision making (Goldberg, 2001). Actor-centered decisions are the result of questions learners ask that are driven by their own purposes, needs, and interests and relate to what is currently happening. Simple examples include “How often does my plant need water?” “How can I identify the birds in my backyard?” “What would it take to become an astronaut?” “Why did the coyote eat my cat?” and “What is gravity made of?” Most of these questions are particularly difficult to address in the classroom if the teacher is committed to direct instruction. Throughout the book we will refer to actor-centered, adaptive decision making as “learner-driven” decision making.

Goldberg distinguishes between actor-centered, adaptive decision making (we call it *learner centered* and *learner driven*) and veridical decision making. Adaptive decision making capitalizes on the learner’s need to know and results in answers of meaning to the individual. Veridical decision making relies on what is known and/or was discovered by others. It is factual. The former sparks thinking and the search for solutions; the latter relies on answers that are essentially right and wrong and can be “plugged in” or recalled irrespective of context.

*How do we teach using learner-driven decision making and also teach the essential facts, information, and procedures that are a part of the formal curriculum and the highest standards? This book attempts to answer that question.*

It is important to remember that development of higher-order thinking skills and of the prefrontal areas of the brain is a process. Anatomically, these functions are present in infancy in very basic and limited ways. They reach maturity some time in late adolescence or early adulthood. Knowing how to challenge and teach children and young adults in order to develop these functions requires that students are challenged continually to make decisions, plan, interact with others, complete tasks, regulate their own emotions and behavior, and evaluate and analyze their work and actions. (For more, go to [www.nlri.org/research](http://www.nlri.org/research).)

## SHIFTING YOUR INSTRUCTIONAL APPROACH

For education to function in this more sophisticated way, new approaches to teaching are needed, and a clear developmental path must be laid down along which educators can walk together. (This sequence of instructional approaches was first developed in Caine & Caine, 1997a.)

This book begins with the traditional approach, which we have simply called Instructional Approach 1 (IA1)—Direct Instruction. It then sets out to guide educators through an interim approach we call Instructional Approach 2 (IA2)—Project-Based/Problem-Based Learning and Teaching (among others), where new methods and practices expand on Instructional Approach I. Ultimately, it leads to a way of teaching that utilizes aspects of the other two approaches as appropriate but goes much further in order to accomplish what is needed. We call that Instructional Approach 3 (IA3)—The Guided Experience Approach.

The latter type of teaching begins with the highest standards, but rather than teaching through direct transmission from the person who knows (teacher) to the one who doesn't (student), it embeds and consolidates essential knowledge and skills in experiences that call for learner-driven questions and processes.

The differences in the three approaches are as follows:

### IA1—Direct Instruction

*The underlying view of learning emphasizes memorization of facts and skills and decision making that relies on answers that can be reduced to right and wrong (veridical decision making).*

*The approach to instruction largely focuses on teacher presentations followed by replication of content and practice and rehearsal.*

*Assessment is based on completion of assigned work and scores on standardized tests.*

### IA2—Project-Based/Problem-Based Learning and Teaching

*The underlying view of learning combines intellectual understanding and memorization, with some opportunities for student decision making based on their personal need to know (learner-driven decision making).*

*This approach to instruction requires teacher-designed experiences orchestrated around concepts and meaning and includes student choices and input on assignments, class rules, and assessment (e.g., community input on rubrics).*

*Assessment is based on authentic assessment, using student demonstrations and modeling as well as scores on standardized tests.*

### **IA3—The Guided Experience Approach**

*The underlying view of learning calls for students to make sense of experience as well as intellectually understanding material, with strong emphasis on personally meaningful questions and decision making, and focuses on the development of higher-order thinking skills.*

*The approach to instruction includes real-world projects with the appropriate skills and curriculum knowledge embedded, substantially driven by student choices and interests.*

*Assessment is based on authentic performance of all kinds through ongoing, authentic questioning, investigation, and documentation, including tests that require the use of student higher-order learning (use of their executive functions or higher-order thinking skills).*

## **THE INSTRUCTIONAL APPROACHES AND THE COMMON CORE STATE STANDARDS**

In recent years a major, and somewhat controversial, set of standards have been developed under the auspices of state education chiefs and governors, for K–12 education in English/language arts literacy and mathematics. At the time of writing, these standards have been adopted by 43 states (see <http://www.corestandards.org/>).

The key to implementing the Common Core State Standards (CCSS) is to see that a fundamental shift is needed in how to deal with instruction.

*The shift to Common Core State Standards is an example of second order change. It is a shift in the philosophical thinking about the nature of teaching and learning. This shift basically says: We will no longer teach students to memorize by rote, to understand superficial facts and figures without a more nuanced understanding, applicable to real-world problems. Rather, we will teach them to analyze, to generate and test hypotheses. We will ask them to think like mathematicians rather than just do math. We will ask them think like writers rather than just scribble sentences. We will ask them to use complex cognitive skills to analyze the very complex problems they face as citizens in the 21st century. (Learning Sciences Marzano Center, n.d.)*

Notice that the first thrust in this book is precisely along the lines advocated by the Marzano Center in the quote above: It is the shift from IA1—Direct Instruction to IA2—Project-Based/Problem-Based Learning and Teaching. This shift will develop deeper understanding and greater skill. However, the key to genuinely producing real-world competence in the long term is then to make the shift to IA3—The Guided Experience Approach. The reason is that immersion of the learner in experiences in

which the content and practices are applied and embedded is what makes real-world competence possible.

## **SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS CURRICULUM**

Science, technology, engineering, and mathematics (STEM) is a curriculum based on the idea of educating students in four specific disciplines—science, technology, engineering and mathematics—in an interdisciplinary and applied approach. Rather than teach the four disciplines as separate and discrete subjects, STEM integrates them into a cohesive learning paradigm based on real-world applications (Hom, 2014). A huge commitment is being made in the United States and elsewhere to STEM education.

## **THE NEXT GENERATION SCIENCE STANDARDS**

Largely based on STEM, the foundational U.S. standards, released in April of 2014, are known as the Next Generation Science Standards (NGSS). Here are five conceptual foundations:

1. Science education should reflect the interconnected nature of science as it is practiced and experienced in the real world.
2. The NGSS are student performance expectations—not curriculum.
3. The science concepts in the NGSS build coherently from K–12.
4. The NGSS focus on deeper understanding of content as well as application of content.
5. Science and engineering are integrated in the NGSS, from K–12.

It can be seen that NGSS and current STEM education represent a superb example of the theme of this book: It is a shift away from IA1—Direct Instruction and a move toward IA2—Project-Based/Problem-Based Learning and Teaching and IA3—The Guided Experience Approach.

### **Professional Teaching Standards**

We refer to the National Teaching Standards created by the National Board for Professional Teaching Standards ([www.nbpts.org](http://www.nbpts.org)) in almost every chapter because they correlate so closely with what we are advocating. (They were supported by the Carnegie Forum on Education and on the Economy's Task Force on Teaching as a Profession.) The national board consists of a board of directors, the majority of whom are classroom teachers, and is a nongovernmental, nonprofit, nonpartisan, and independent organization. Support and endorsement are wide ranging and include both major political parties.

## SUPPORTING SCHOOL LEADERS

*To bring health to a system, connect it to more of itself. The primary change strategy becomes quite straightforward. In order to change, the system needs to learn more about itself from itself. The system needs processes to bring it together. Many different processes will work, whatever facilitates self-discovery and creates new relationships simultaneously. The whole system eventually must be involved in doing this work; it can't be done by outside experts or small teams. (Wheatley, 1999, pp. 145–146)*

Professional development is an ongoing and demanding process. The principles and practices that are needed to teach children well also should apply to the development of adult educators. Solid professional development efforts stabilize conditions when circumstances become stressful. For that reason this is a field book and a process book. There is a sequence to it, but as people work through the book, they will find that every part sheds light on every other part. The result is that in addition to acquiring specific strategies and ideas, educators will begin to make shifts in how they think about their work and how they perceive and respond to what happens in class and in the school. This means that moving from Direct Instruction to Project-Based/Problem-Based Learning and Teaching to the Guided Experience Approach is a transformational process.

For those principals, assistant principals, and central office administrators charged with setting the course of improvement for their schools and districts, we offer a special section at the conclusion of each chapter because successful professional development and school reform depend on bold, well-informed leaders.

Much has been written about leadership, and there are many different ways of classifying modes of leadership. Greenleaf (2002), for instance, is known for his work on servant leadership. And as long ago as 1939, Kurt Lewin (1952) differentiated between autocratic and participative leaders.

Two overlapping approaches that are congruent with modern theory and research and in line with the spirit of this book can be found in two exciting texts by some of the authors of this book.

The notion of generative leadership text superbly serves our overall purpose and can be found in the book by coauthor Karl J. Klimek and his colleagues Elsie Ritzenhein and Kathryn D. Sullivan: *Generative Leadership: Shaping New Futures for Today's Schools* (Corwin Press, 2008).

Coauthors Geoffrey and Renate Caine focus more directly on Process Leadership. They write that “a process leader is someone who creates the conditions that allow others to succeed. More specifically, Process Leaders are the people who guide, support, nurture, and facilitate the PrC’s” (Caine & Caine, 2011, p. 94).

While they handle the day-to-day matters of administration, empowering leaders both facilitate the process of learning and also create the generative space for new possibilities to emerge and for people to work together to test assumptions and cocreate more effective ways of teaching



and doing their work. Therefore, while we cannot deal with leadership in great depth, we introduce some suggestions and processes in every chapter to support empowering leadership.

### **This Book as a Resource**

Educators are invited to use this book as a professional development and personal resource, supplementing other processes that bring benefit to their schools and communities. It is important to recognize that genuine transformation and improvement always involve both formal and informal elements. Meetings, in-service sessions, planned activities, and other school-centered gatherings are natural opportunities to explore these ideas and practices. However, it is important to walk the walk and talk the talk in our daily lives, to live the ideas and practices in all those brief moments and unexpected interactions that are the stuff of life in the everyday world. Expanding upon these elements, we address the final section of each chapter to transformational, proactive leaders precisely because they—you—are the people for whom brain/mind learning is of greatest importance . . . equipping you with relevant ideas grounded in current research.

For additional reading we recommend the following:

Caine, R., & Caine, G. (2011). *Natural Learning for a Connected World: Education, Technology, and the Human Brain*.

McCombs, B., & Miller, L. (2007). *Learner-Centered Classroom Practices and Assessments: Maximizing Student Motivation, Learning, and Achievement*.

Caine, G., & Caine, R. (2010). *The Brain, Education and the Competitive Edge*.

Schwahn, C. J., & Spady, B. (1998, 2010). *Total Leaders 2.0: Leading in the Age of Empowerment*.

**In tandem with the  
National Teaching  
Standards.**

Accomplished teachers work with colleagues to improve schools and to advance knowledge and practice in their field. They define their responsibilities as professionals to include a commitment to the continuing growth and development of their colleagues, their school, and their field. They do so because they see themselves as members of a larger learning community with responsibilities that extend beyond their classroom, including a responsibility to shape a healthy professional culture in their school. Their involvement with peers is planned and purposeful; it improves their own effectiveness as teachers, expands their knowledge of students [and] how their field connects to others, and contributes to the knowledge and skills of other teachers and education.

—Standard XII: Meaningful Learning

The nature of this book beautifully coincides with the collaborative actions suggested by this National Teaching Standard. Look at the idea of learning circles developed in Resource C. Seriously consider implementing them in your school. How would it begin? How could you start the process of reflection as a community?

### **Mastering the Vocabulary: Getting Started**

12 Brain/Mind Principles of Natural Learning p. 4

Learning capacities p. 6

Three critical elements p. 6

    Relaxed Alertness p. 7

    Orchestrated Immersion in Complex Experiences p. 9

    Active Processing of Experience p. 10

Actor-centered, adaptive decision making p. 12

Learner-driven decision making p. 12

Executive function p. 2

Veridical decision making p. 12

Instructional approaches p. 13

    Approach 1—Direct Instruction p. 13

    Approach 2—Project-Based/Problem-Based Learning and Teaching p. 13

    Approach 3—The Guided Experience Approach p. 14

Process Learning Circles p. 18

Professional teaching standards p. 15

Empowering leadership p. 16

Common Core State Standards (CCSS) p. 14

Science, technology, engineering, and math (STEM) p. 15

Next Generation Science Standards (NGSS) p. 15