

ENGAGE THE BRAIN

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INTRODUCTION

It came down to the final few seconds of Super Bowl XLVI. New England Patriots quarterback Tom Brady had one final chance to pass the ball for a touchdown that would make the Patriots the Super Bowl champions for the 2011 season. It had been a close game against the New York Giants. The Patriots led 10–9 at halftime and were still ahead, 17–15, with two minutes left in the game. However, in the last minute, the Giants scored a touchdown, putting them ahead by 4. The Patriots needed a touchdown to win. On this cold Sunday night in February 2012 in Boston, I was glued to the television as Brady sent a final “Hail Mary” pass down the field. It was incomplete. The Patriots lost, and I went upstairs and collapsed into tears.

I am not a football fan. I don’t think I have ever actually watched an entire game, but I was devastated by the outcome of this particular game. You see, the headmaster of the school where I was a teacher had said that if the Patriots won, the school would be closed the following day. I would get one day off from teaching my high school science classes—a retreat

in the middle of the cold, bleak, break-less part of the school year. My newfound enthusiasm for football was unbelievably passionate! I was confident in the pundits' predictions. The Patriots would win, and I would spend my Monday indulging in a slow breakfast, sipping hot coffee, and reading my favorite book in my pajamas.

As shocked as the Patriots were in defeat, I too fell into a similar state of shock that had nothing to do with football: I had to go to school the next day. Logically I knew that this one school day—seven hours—was not that significant in overall scope. I had already prepared the lesson, and now, with a regular Monday class session, we would not fall behind in content. Why was I so upset? I really liked my job, I had an incredible group of motivated students, and I was passionate about the content I was teaching. Emotions seemed to overrule my logic, and my tears continued to flow.

Looking back, I reflect on my Super Bowl meltdown with a statement from David Rose, a developmental neuropsychologist and long-time faculty member at Harvard University's Graduate School of Education: "Teaching is emotional work." My reaction to the Patriots' loss was not about dissatisfaction with my job, career, or overall direction in life. Instead, the emotion of teaching had overwhelmed me, and I was drained. By February, those seven hours of relief from the emotional energy required for effective teaching had become a magical oasis, a reprieve that I was desperately craving.

I started noticing more examples of the central role of emotion in teaching. At an opening faculty meeting I remember a second-year teacher sharing her concern: "I love the students, but I hope I can make it through this year." That was all she could say before she choked up with tears. Even though I have been in education for almost two decades, I still get those pangs of anxiety, butterflies in my stomach, and apprehension at the start of the school year. I could feel her anticipation of the emotional energy required for effective teaching.

Many people think that they can teach, perhaps because they have been students in school themselves or because they have

expertise in a subject they enjoy. Often that confidence is overblown. A very successful Washington, DC, attorney joined a high school faculty to teach civics after a 20-year career in law. He was exhausted by spring break of his first year and was unable to return to the classroom. He commented that his time as a teacher had been the most challenging six months of his life. Content expertise is only a sliver of teaching; the rest is emotional work.

The Purpose of This Book

The purpose of this book is to inform educators about the brain science related to emotion and learning, and, more important, to offer strategies to apply these understandings to their own teaching. Although many of the approaches I describe will be familiar, integrating the lens of emotion and the brain may be a new concept. As an educator, I had been trained in how to deliver content and organize my lessons, but I had not been taught how to design learning experiences that support emotions for learning. I hope this book empowers educators to incorporate emotional design for learning.

Brain science shows that emotion is essential for learning. The title of an article by Immordino-Yang and Damasio (2007)—“We Feel, Therefore We Learn”—captures the essence of the point. In addition, Van Gorp and Adams (2012) describe how “emotion paints our understandings, commands our attention, dominates decision-making, and can enhance our memories” (p. 4). If emotion networks of the brain are damaged, memory, perception, and certain other cognitive processes remain intact; however, learning is compromised. Without the ability to feel emotional responses, individuals are left unable to make even a simple cognitive decision, such as what to wear in the morning. For patients who sustain damage to the ventromedial prefrontal cortex, their “social behavior was compromised, making them oblivious to the consequences of their actions, insensitive to others’ emotions, and unable to learn from their mistakes” (Immordino-Yang

& Damasio, 2007, p. 4). Skills essential for academic success also rely on emotion. Indeed, many aspects of cognition, including attention, memory, and social skills, are intertwined within emotions. For rigorous learning, students must be engaged.

Educators play a critical role in designing environments for engaged learning. They have choices for how to design in ways that build background knowledge and so students can show what they know. Educators have a choice about how to make the material relevant, relatable, and engaging. However, many still believe that emotions are superfluous for learning and actually interfere with the learning process. I have heard educators say, “Check your emotions at the door,” “I do not teach for emotion; I teach content,” or “I want my lessons to be rigorous, so I don’t have time to worry about whether it also engages them.” Additionally, I have heard students say, “School is not for enjoyment; it is for learning.” These comments are misguided. Now that we can peer inside the brain, we see that emotion networks are interconnected with cognitive networks—not separate systems. Emotions enable us to learn.

This book offers practical strategies for educators of all levels and content areas to design learning experiences that incorporate emotion for learning. Student brains are not simply waiting to be filled with information. Instead, students’ emotions must be activated, attention captured, and memory supported, so that learning becomes something that is intrinsically motivated and can be transferred to real-world experiences.

How This Book Is Organized

This book presents six approaches, or strategies, for designing learning environments that tap into the power of emotion:

- Activate physiology with clear goals and purposeful, aligned options. Make it relevant.

- Design for variability using Universal Design for Learning (UDL).
- Foster the development of brain networks in the brain by modeling, reflecting, and providing feedback.
- Captivate attention with routines, novelty, and autonomy.
- Scaffold memory networks with multisensory and emotional connections. Work to reduce cognitive load.
- Intrinsically motivate using theories of flow and self-determination. Communicate about emotions.

Each of the book's first six chapters covers one of the strategies in depth. Chapter 1 explores how emotions activate the body's physiology for learning and acknowledges how the range of student activation can become overwhelming for an educator to address with dozens of learners in their classes each day. Chapter 2 discusses variability and how the Universal Design for Learning framework can be leveraged to reduce barriers and support the predictable range of learners. The brain's remarkable ability to change due to interactions with the environment is explored in Chapter 3. Chapters 4 and 5 go beyond basic physiological activation to examine how emotions direct and captivate attention and support memory. Ultimately, the goal is for learners to be intrinsically motivated, and Chapter 6 offers strategies to design for this deep level of engagement. Chapter 7 focuses on the teacher perspective and considers how to design professional environments that will sustain educators' own emotional energy for teaching.

This book challenges educators to go beyond being a subject-area or grade-level expert who knows how to deliver information and to think of themselves as designers who craft experiences that first value and address emotion for learning. It also recognizes that teaching itself is emotional work.

How can educators design for engagement? How can we leverage brain research to inform our design? Instead of educators saying, “My students are not engaged,” this book challenges them to ask, “How does the design of the learning environment engage my students?” The strategies described can be applied to any content, grade level, or context, including after-school programs, outdoor learning, coaching, online courses, higher education courses, or home schooling. Share ideas from this book or use the Reflect and Discuss questions within each chapter for professional learning group (PLG) or department team discussions.

Defining Terms: *Emotion and Engagement*

Two key terms used in this book are *emotion* and *engagement*. The definition of *emotion* used in this book is largely informed by the work of Lisa Feldman Barrett (2017a) and aligns with growing evidence that there are not isolated emotion centers in the brain that are waiting to be activated. Instead, emotions are a result of changes that take place in the brain and body physiology due to an interaction with the environment and that are related to previous experiences. For example, you may describe the emotion “happy” when you eat a sweet chocolate dessert. The first bite activates changes in your brain and body, such as taste receptors that trigger dopamine release, giving you that “I liked that; let’s do that again” feeling. You may have memories of eating chocolate as a child that contribute to what you have learned and to how you are appraising this current situation. The context and background experiences really matter for how we interpret the changes of our brain and body and for how we ultimately interpret and label the emotion. Therefore, when I say, “I am happy,” you and I may have a shared understanding of what this means based on our own experiences. Emotions are constructed

and learned, and together we build a shared language for understanding what these emotions are and mean.

Engagement involves increased focus, participation, and interest. We may turn our head to pay attention, close our eyes to concentrate, or lean in to be more present in the moment. We may be more willing to sustain effort and persist through challenges when we are engaged. I hope you engage with the content in this book in both active and reflective ways. You may draw pictures, take notes, have discussions, and try some ideas in your classrooms!

Use the following example to reflect on the distinction between emotion and engagement. Imagine you witness a car accident—a minor fender-bender that happens right in front of you. You may respond emotionally to the accident as your heart and breath rate increase and your palms become sweaty. You interpret the emotion or feeling to be a mix of dread (Is everyone all right?) and frustration (I might be late now) based on past experiences with this kind of situation. You engage in the event with alertness and direct attention to the scene, preparing to help out or reroute your drive. Others who witness the accident may have different physiological changes triggered by their previous experiences. They may engage in the situation differently and use different words to describe their emotions.

The Connection to Brain Science

This book supports the growing interest in and emphasis on “brain-based” teaching strategies and a need for attending to the social-emotional needs of learners. Although it can be argued that research from a controlled neuroscience laboratory is too rigid to be applied to the dynamic, bustling environment of a classroom, connections between the two fields are important to bridge. To educate effectively, we must understand the learning brain. We can strengthen

the neuroscience-to-education loop, as educators are in the business of building brains, and we can inform neuroscientists of important observations or problems of practice for further study. A community college instructor once told me, “If you teach about the brain, it will help [teachers] better understand why certain practices work more than others.”

Four overarching themes about the brain recur throughout the book:

- Emotions are central for learning.
- There is a tremendous range or variability in how individuals learn. There is even variability in learning preferences within the same individual at different times; no individual has a fixed learning style.
- The brain has incredible plasticity and can change based on interactions with the environment.
- Background and experience really matter for learning.

Reflect and Discuss

Throughout this book you will find text boxes that ask you to reflect on and discuss the main points that have been covered. You can begin that process by asking yourself or discussing with a professional learning group the following questions:

1. Reflect on something you learned well in school. How did emotion play a role in that learning?
2. What emotion design strategies do you already incorporate into your learning environment to engage students?
3. Review the four overarching themes about the brain listed at the end of this Introduction. Which resonate? Which are new to you or different from what you may have believed?
4. How would you describe your emotions right now? How are you engaging in the reading experience? How is the design of your environment supporting (or not supporting) your engagement?