

*The Brain and Learning*

Introduction by Kurt Fischer and Mary Helen Immordino-Yang

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Summary Review by Emilian Aguilar '15

In the "Introduction" of *The Brain and Learning*, Kurt Fischer and Mary Helen Immordino-Yang recognize a need to change education. They propose an answer can be found in the biological sciences, and offer this book as a collection of resources for educational neuroscience. The book contains a variety of articles that serve several purposes for the reader. The book is divided into seven parts to help organize the articles into clusters on the various concepts.

The first group of essays provide an overview of the brain. These articles focus on making the reader familiar with terminology, and assist in opening the audience beyond educators with experience in biological studies. The third chapter contains insightful information. The article takes several selections from *How to Explain a Brain*. These selections quickly explain several major concepts for educational neuroscience that will be found in later chapters.

The second part addresses "brain-based education." This concept is focused on the idea that certain activities in the classroom can help educate the brain and foster critical thinking and deeper learning. Not all of the articles provide a positive evaluation of "brain-based education." John T. Bruer's article "In Search of... Brain-Based Education," discredits the idea that these suggestions come from brain research. Instead, Bruer claims that all of these ideas on using neuroscience result from preexisting work in cognitive and developmental psychology.

The third part of the book, addressing memory, cognition, and intelligence, opens with an article dedicated to explaining the various forms of memory, such as episodic, procedural and implicit. One such pedagogical change that part three calls for is to teach wisdom to students. In "The Balance Theory of Wisdom" Robert J. Sternberg outlines sixteen principles in instructing wisdom. Many of these principles focus on teaching the students a form of interdependence, and to understand their own interests, and how to achieve goals. By developing wisdom, Sternberg hopes that the student is forced to think critically about actions and goals.

The fourth part of the book brings up the impact of emotion in education. In "We Feel, Therefore We Learn," Mary Helen Immordino-Yang and Antonio Damasio discuss the relationship between learning and emotion. They state that students learn or have an interest to learn for primarily emotional reasons. Chapter fourteen, "The Effect of Violence and Stress in Kids' Brains" by Ronald Kotaluk, lists negative experiences as an external threat to the brain's functionality, specifically memory. The stress hormones associated with these experiences hinder memory and also learning.

The fifth part focuses on how the brain learns from language, reading and math. With the chapters concerning language, the articles describe the processes by which we perceive words. The articles delineate the parts of the brain which are associated with reading and understanding a language. Most of the fifth part of *The Brain and Learning* is used to describe the actual processes in the brain during these three basic activities. Each article presented details the process by which the brain handles learning these foundations of academia. Chapter 17 provides a well-written, general overview of what occurs in the brain when a child reads. In the chapter, "What Happens in The Brain When Children Read," the vocabulary and process is laid out in a well-formatted article. In the chapters on mathematical development, the authors' approaches are modeled on the language and reading skills needed to learn math. The mathematics portion introduces models of learning, such as McCloskey's Model, which divides calculation abilities into "two clusters of functional components."

The sixth section of the book focuses on using the Arts to help the brain develop. The first chapter in the portion makes the claim for the importance of the Arts to learning. In the article "The Brain and the Arts," David Sousa provides the correlation between arts and higher scoring in schooling, such as higher scores on SAT tests. Chapter 21, "The Role of the Arts in Transforming Consciousness," claims that the fine arts help foster imagination and sensibility, which provide the brain with the means for creative thinking. He continues to say that representation is also a beneficial cognitive function that the arts help nourish. Representation allows the brain to put an image to an idea.

The final part of the book focuses on "The Exceptional Brain." Like the previous sections, part seven of the book begins with an introductory chapter, "Exploring Exceptional Brains." Eric Jensen notes that the difference associated with "gifted children" is based on an increased number of glial cells, which are correlated with improved memory and learning. Jensen makes great use of images in highlighting the parts of the brain he is talking about to help the reader have a visual as well as verbal understanding of his argument. The final two chapters present the issue of autism. In Chapter 25, "The Great Continuum," Temple Grandin provides the symptoms and overview of diagnosing autism. The final chapter "Broken Mirrors" presents a theory that "mirror neurons" may allow an autistic person to see themselves as others see them. Much of the final chapter is theoretical and introduces the reader to theory of a potential cause and cure for autism by repairing non-functional mirror neurons.