Rules for Engagement: Understanding Brain Science Supports Educational Success

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**Abstract**

This book review explores and analyzes *Brain Rules: 12 Principles for Surviving and Thriving at Work, Home, and School* by molecular biologist John Medina. Medina is interested in how emerging brain science can affect educational, work, and parenting paradigms. Organized around twelve “brain rules,” the book offers interesting and empowering insights into how making changes in the ways we engage, teach, and motivate ourselves and others can have a positive impact on our success. His straightforward descriptions and explanations, combined with entertaining anecdotes help the reader gain an understanding of how following these rules can improve not just our learning and memory, but also our lives. Hailed as “one of the most informative, engaging, and useful books of our time,” Medina’s *Brain Rules* provides a basis for understanding our brains and getting the best results possible.

**What are Brain Rules?**

Written by developmental molecular biologist John Medina, *Brain* Rules opens with an explanation of why it is important for us to understand how our brains work, and the claim that a lack of understanding of how the brain works and learning occurs prevents us from fully engaging and making the most of our incredible brain power. Furthermore, Medina argues that if “teachers, business professionals, education majors and accountants, superintendents and CEOs” are not abreast of current issues and discoveries in neuroscience, then we are “out of the loop,” in terms of creating optimal learning and working environments and opportunities.

Medina organizes the book around what he calls “brain rules,” or twelve principles “for surviving and thriving at work, home, and school.” Essentially, each “rule” introduces the reader to something that is known about how the brain works, and for each “rule” Medina explains the science and offers suggestions for how the rule can be applied to enhance working, teaching, and learning environments. His goal, as stated in the introduction, is not to provide a thorough and exhaustive analysis of the science, but rather to provide an accessible resource for anyone interested in improving teaching, learning, engagement, productivity, creativity, and success.

In addition to the book, Medina has published a DVD, which can be found at [*www.brainrules.net/dvd*](http://www.brainrules.net/dvd), and this video resource provides a condensed overview of each of the twelve “brain rules.” In short, these rules are: 1) exercise boosts brain power; 2) the human brain evolved too; 3) every brain is wired differently; 4) we don’t pay attention to boring things; 5) repeat to remember; 6) remember to repeat; 7) sleep well, think well; 8) stressed brains don’t learn the same way; 9) stimulate more of the senses; 10) vision trumps all other senses; 11) male and female brains are different; and 12) we are powerful and natural explorers. As educators, we can to one degree or another follow these rules to enhance learning in our classrooms. And, while some of the rules are beyond the scope of our classrooms (e.g. sleep), it is useful for us to know the impact and implications of these principles in order to better understand the ways in which students may be struggling to learn and perform in school.

**Using Brain Rules for Teaching and Learning**

While all of the “brain rules” are important in terms of learning and productivity, rules 1, 4, 5, 6, 9, 10, and 12 seem particularly important in terms of creating engaging and meaningful learning opportunities. These rules, in order, have to do with exercise, attention, short-term memory, long-term memory, sensory integration, vision, and exploration.

***Exercise*** provides increased blood to the brain providing glucose, oxygen, and protein, all of which are important for optimal brain function. Additionally, studies have shown that aerobic exercise dramatically decreases the risk of developing dementia and Alzheimer’s. Typical learning environments, however, often attempt to engage students who while seated are expected to quietly and passively receive instruction. Increased physical activity, even moderate or brief, can help students learn more, more often. Incorporating movement into classroom routines, be it permission to stand and walk around the room occasionally, or more structured protocols for participation such as “stand if you agree,” needs to be considered by all concerned with students’ learning. One example given for using exercise to “boost brain power” in an office environment is of a “standing workstation” where an employee can walk on a treadmill while working on a computer. Imagine the benefits of a similar setup in our classrooms!

***Attention*** is essential for learning to occur. Medina points out that “the more attention the brain pays to a given stimulus, the more elaborately the information will be encoded—and retained” (74). Furthermore, he points out that “a strong link between attention and learning has been shown in classroom research both a hundred years ago and as recently as last week” (74). Recent research has also shown that most people lose interest in a presentation or lecture within the first ten to fifteen minutes. Most high school classes, however, last between fifty and sixty minutes, so it is imperative that educators understand the limitations of their students’ attention spans, as well as ways to re-engage them. The chapter goes on to explain that emotions get our attention, meaning holds our attention over details, the human brain cannot multitask, and it needs occasional breaks. Lectures, or other methods for delivering content can be chunked into ten minute segments, and each of these segments should focus on a single large, general concept that is made relevant through narratives or “events rich in emotion” (89).

***Short- and Long-Term Memory*** is particularly important for learning to occur, and these brain rules we would be wise to utilize in our classrooms. Essentially, we remember events that are introduced in compelling ways because what happens in the first few seconds of learning can “predict whether something learned will also be remembered” (119). Medina explains that this has to do with the way in which the brain encodes and stores newly acquired information. Medina’s analysis provides opportunities for educators to think about the ways in which new information is presented to students, and in conjunction with several of the other brain rules to reevaluate how content and other information is taught or transferred. Supporting students in effective and reliable long-term memory acquisition and maintenance also requires special consideration, because new information is always being mixed with older memories, the result of which is that they are stored together. Medina suggests adding new information gradually, and underscores the importance of repetition for both short- and long-term memory.

***Sensory integration, vision, and exploration*** are each treated as the separate brain rules they are, but obviously they overlap and are all extremely important for learning to occur. Basically, the more senses that are engaged when learning is meant to occur, the more successful learners will be, and because vision is our most important sense, it should always be considered and included. Medina’s final “brain rule” deals with exploration, and he argues that it is curiosity that fuels exploration, and says, “I think that we must do a better job of encouraging lifelong curiosity, in our workplaces and especially in our schools” (274). He provides the example of Google’s “20 percent time,” in which employees are allowed and encourage to explore and create, which has resulted in the advent of several of their most successful products. What is missing, however, from an approach to curiosity-driven exploratory methods of education is a collaborative effort between education scientists and brain scientists. Medina offers the model of medical schools where students obviously do “book-learning,” but also engage in “consistent exposure to the real world” through teaching hospitals. The world of project-based learning that myself and other educators are exploring would be well-served by this type of collaboration, which could provide the “hard-nosed empirical results that show the long-term effects of these styles” (274). This, in turn, could help advance these promising teaching and learning methods.

**Conclusion**

*Brain Rules*, as well as the related website, provides an engaging and accessible overview of the neuroscience associated with optimal learning experiences and throughout the book and the website Medina models successful methods for communicating, teaching, and transferring information. Interesting and engaging stories gain and regain our attention, multimedia on the website engages multiple senses, and many of the anecdotes involve having the reader recall previous information or knowledge either from life or what has previously been presented in the book, which helps the reader integrate new information and knowledge, and remember what they have learned. As Medina points out, more research is needed into the areas of innovative teaching methods such as project-based learning and technology integration, and how and when these methods best facilitate deep, engaged, and meaningful learning.

As we transition into the Common Core State Standards, integrate technology into our classrooms, and develop curriculum and instruction that facilitates the acquisition of 21st Century skills, it is imperative that we make best use of what is now known about how we learn through the work of neuroscience. Indeed, after reading *Brain Rules*, one becomes even more flummoxed as to how so-called traditional educational paradigms—“sit and get” or “teach and test”—have survived for as long as they have given that they run counter to how our brains work and we best learn. Teacher preparation programs, as well as in-service staff development, must consider and make use of recent and ongoing discoveries, and resources like *Brain Rules* make this easier and more accessible than ever before.

**References**

Medina, John (2008). *Brain Rules: 12 Principles for Surviving and Thriving at Work, Home, and School*. Seattle: Pear Press.