



Research Brief

Brain Research to support recommendations from Breaking Ranks

Question: How does brain research support the recommendations from Breaking Ranks?

Summary of Findings:

There was a great deal of information about specific schools that have implemented recommendations from Breaking Ranks. Although many of the articles described specific types of data used to inform decisions, none was available on how brain based research was used or how it tied into the recommendations. The major recommendations from Breaking Ranks are cited below. Under each, there is information on how some of the brain learning research relates to each recommendation. Much of the current information in this field can be applied to most of the recommendations.

Major Findings and Conclusions:

- 1) Every school should expect that every student will demonstrate high academic achievement in alignment with the national standards.
 - The brain has been compared to a Cineplex movie theater, where information is constantly entering it, often simultaneously. The brain seeks patterns and builds on to prior knowledge. When the brain is on overload and/or cannot make a meaningful connection, it automatically eliminates it.
 - One of the most useful ways to support long-term memory retention is for unfamiliar information to be tied to familiar information that is relevant to the students' lives.
- 2) A school's programs must provide bridges for multiple options
 - Abstract reasoning develops at different rates in the brain's frontal cortex and usually is not more highly developed until the 10th or 11th grades. This appears to develop earlier in males than in females.
 - Some of the hormonal issues that students experience in young adolescence, or the middle school ages, carry through into the first two years of high school.
- 3) Each student should be a life-long learner
 - "Learning is a social event; for any of us to become lifelong learners, we must engage in the process with others" (Sprenger, p. 8)
 - A person's brain is not fully developed until he/she is between 22 and 35. If the brain has been stimulated throughout his/her life and learning has been valued and modeled, this will help promote life-long learning.
- 4) Students must have ample chances to develop their social as well as academic natures & 5) To help train students to live and work in a diverse and multicultural global world, appropriate experiences should be an integral part of the students' school life.
 - The brain is social in nature. In order for productive learning to take place, students must have opportunities to discuss ideas and concepts with others.



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- The part of the brain that reads facial expressions and body language is the amygdala. People need numerous occasions to develop and explore the social natures of themselves as well as those of others in order to be able to develop positive and productive social relationships.
- 6) Students must have meaningful experiences to effectively utilize technology.
- Because each brain takes in information in different ways, the use of technology can provide individualized and relevant learning experiences. If the learning is meaningful, then the brain will make synaptic connections that will promote dendritic growth.
 - Students "must be globally aware and able to use resources that exist outside the school" (Peck & Dorricott, p. 3). Technology allows the students to explore the world at large, thus creating more dendritic growth.
- 7) High Schools must be advocates for young people
- Peptides are receptors in a person's bloodstream. Their primary role is to act as the brain's and body's main communicator and is responsible for 98% of communication. Peptides can either stimulate or slow down the synaptic connections in the brain.
 - Information first enters the brain through the brain stem. This is also the part of the brain where a person's survival mechanism is located. If the peptides have communicated to the brain that it is in an unsafe situation, it will downshift and go into survival mode. If the brain is in this mode, it cannot learn.
 - When emotions and reactions are positive and the brain feels safe, supported, and/or cared about, learning can take place. The reverse applies. When emotions and reactions are negative and there is a sense of feeling unsafe, unsupported, and/or unwanted, learning cannot take place.

Online Resources:

- *Breaking Ranks: A framework for secondary reform project*
A description of the process used in Vermont in conjunction with the Northeast and Islands Regional Education Lab and Brown University is offered.
http://www.lab.brown.edu/programs/lab2000/secondary_breaking.shtml#Data
- Brown, M. H. *Breaking Ranks: Blueprints for futures schools*
This article provides the major themes that are present in Breaking Ranks. There is also a description of the roles that the principals, students, and teachers should play in the 21st century.
http://alliance.ed.uiuc.edu/email/list-archive/IAES_1996-97_119.html

Articles:

- Caine, R. N. (2000, November) Building the bridge from research to classroom. *Educational Leadership*, 58, (3).
This article describes what happens to the brain and learning, when downshifting occurs.



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- Given, B. (2000, November). Theaters of the mind. Educational Leadership 58 (3).
A description of how the brain is on and taking in information, 24-7 is provided. It has strong implications for educators on the types of learning students are expected to do and can actually do, based on brain-based research.
- Wolfe, P. (1998, November). Revisiting effective teaching. Educational Leadership, 56, (3).
Brain-based research is compared to Madaline Hunter's Elements of Effective Instruction, and how it is still important and valid.

Books:

- Given, B. (2002). *Teaching to the brain's natural learning systems*. ASCD: Alexandria, VA.
This book provides an overview of how the brain is structured. It covers the brain's systems of emotions, social, cognitive, physical, and reflective learning. It does provide applications of the ideas into the classroom.
- Gurian, M. (2001) *Boys and girls learn differently*. Jossey-Bass: San Francisco, CA.
This is a guide to brain-based research and how it relates to the different ways in which males and females learn. Most of the book is divided into age appropriate sections that deal with the developmental, chemical, hormonal, emotional, and functional differences of the specific ages and genders.
- Jensen, E. (1998). *Introduction to brain-compatible learning*. The Brain Store, Inc.: San Diego, CA.
The author is one of the foremost authorities in this field. This book is easily understandable. It explains brain-compatible learning, applications of the information to learning and the environment, and how to use the information in the classroom.
- Sprenger, M. B. (2002) *Becoming a wiz at brain-based teaching*. Corwin Press: Thousand Oaks, CA
An analogy is used to connect brain learning to the Wizard of Oz. It provides an overview of the physical structure of the brain, how the brain deals with stress, emotions, cognitive skills, and the learning environment.
- Wolfe, P. (2001) *Brain matters*. ASCD: Alexandria, VA.
This book is for those who would like more advanced information on the structure and function of the brain. The implementation section provides practical suggestions and projects for the classroom.

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