

## Research Brief

### Rationale for Activity Based Alternatives in lieu of Lectures

**Question:** What is the rationale for activity based pedagogy?

**Summary of Findings:**

Since the 1990s was declared to be the decade of the brain, technology has advanced enough through MRIs, CAT Scans and PET Scans, that live brains have been able to be studied. Although this is still a relatively new field of study, what has been discovered thus far, has wide reaching implications for educators in the area of pedagogy and how to best meet the needs of every student. According to Sandra Rief, students preserve

- "10% of what they read
  - 20% of what they hear
  - 30% of what they see
  - 50% of what they see and hear
  - 70% of what they say
  - 90% of what they say and do" (Learning Styles).

**Major Findings and Conclusions:**

The brain:

- views the world from whole-part-whole
- is a parallel processor, it speaks to both sides of the brain
- seeks patterns and novelty
- needs to be challenged
- looks for meaning and connection to prior knowledge
- learns through both focused and peripheral attention
- is able to sit and concentrate at one time equals the age of the student (ie. 15 years old=15 minutes)
- is social
- needs time to digest and reflect upon new information
- needs to do purposeful work

**Memory Highways:** One of the primary goals of education is for students to retain and be able to retrieve information from their long term memories. In order to do this, it is important to teach information in ways where it will go into several different memory banks and the student will easily be able to recover it.

**Working memory:** When information enters the brain, it goes into the prefrontal cortex, where it decides what information to keep and what to discard because it is not an appropriate fit. Unless it makes a meaningful connection, information in short term

memory lasts up to 20 seconds. On average, the brain can retain 7 pieces of new information at one time, so it is important to make connections to as many different memories as possible.

**Semantic memory:** Facts and lists from printed material are housed in the hippocampus. This information is the most difficult to remember and reclaim. Rote and drill activities (however, the brain will become bored if this is overdone) and more elaborate rehearsals, recitations, mnemonics, graphic organizers, inquiry problems, rhymes, discussions of a few paragraphs or passages at one time, outlines, mind-maps, and role plays are some ways for students to more easily retrieve data from this memory.

**Episodic memory:** This memory is also stored in the hippocampus and deals with factual memories related to location. Memory of learning can be triggered by remembering the physical setting in which the learning took place. Have students change seats regularly and change bulletin boards and other parts of the environment so that different locations trigger different learning episodes.

**Procedural memory:** The cerebellum houses muscle or bodily/kinesthetic memories. These include things like driving a car, riding a bike, and touch typing. Lessons should include movement that is frequently repeated in the guise of activities like role-plays and skits.

**Automatic memory:** This is the conditioned-response memory and is located in the cerebellum. Activities that will trigger this memory include decoding, using antonyms, making up songs to go with melodies, developing flash cards, and creating rhymes or rhythms.

**Emotional memory:** All learning has emotion tied to it and is processed in the amygdala. Tapping into and building on the students' experiences and thoughts is important.

**Suggested Activities:** Tying into learning styles and multiple intelligences can stimulate and enhance the different memories

- pre-assessment: what do the students know, need to know to accomplish mastery, what are effective methods to reach the students, how will they be assessed?
- brainstorm ideas and record them
- chunk assignments into smaller, handable pieces
- student choice in assignments
- thematic learning centers
- double-duty or double entry reading logs that include facts/ideas & thoughts/reflections
- jigsaw

- layered curriculum for student choice and degrees of challenge
- conversation circles-each student talks on a topic until time is called, then the next students speaks
- student presentations
- carousel-small groups respond to a concept or idea and record the information on a chart, then the groups rotate and repeat the process until each concept, etc. has been addressed by all of the students
- students express information through drawing, interpreting, demonstrating

### Online Resources:

- Brain-Based (Compatible) Learning  
A summary of 12 principles of effective brain-compatible learning is provided.  
<http://www.eduscapes.com/tap/topic70.htm>
- Brain-based learning  
A brief list of 12 principles that should be in place in order for maximum learning to take place is given.  
[http://www.funderstanding.com/brain\\_based\\_learning.cfm](http://www.funderstanding.com/brain_based_learning.cfm)
- Brain-Based Learning: Where's the Proof?  
A series of questions about concepts on brain-based learning are posed, then responded to. This is a succinct overview of information on this topic.  
<http://www.jlcbrain.com/truth.html>
- Brain Biology: Basic Gardening  
The concept of the pruning process that goes on in an adolescent's brain and the importance of sleep to learning are described and discussed.  
<http://www.help4teachers.com/gardening.htm>
- Brainiacs  
A cautionary note about not believing every thing that is written about how the brain learns is put forward in this article.  
In the Search box, type in Brainiacs.  
<http://www.edweek.com/>
- Brain Research and Education: Fad or Foundation?  
This is the second article on the site. An overview of recent research on the brain and memory are presented. It provides some ideas for classroom teachers on helping students to develop long term memory.  
<http://www.patwolfe.com/index.php?pid=100>

- Kathy Nunley's Layered Curriculum  
A thorough definition and description of a layered curriculum is provided, along with ample of examples.  
<http://brains.org/store/lc/pg1.htm>
- Learning Styles  
A brief description of the 4 learning styles and a few ideas for meeting each in the classroom are presented.  
[http://www.funderstanding.com/learning\\_styles.cfm](http://www.funderstanding.com/learning_styles.cfm)
- Learning Styles  
This cites the percentages of the different ways in which a person retains information. An extensive list of different types of learners with active links to descriptions are included.  
<http://members.aol.com/susans29/lisa.html>
- Learning Styles or Where Do We Go From Here?  
A fully developed description of learning styles and strategies to meet the needs of students are provided in this article.  
<http://www.nwlink.com/~donclark/hrd/learning/styles.html>
- Principles of Brain-based Learning  
A brief overview of 9 important principles of brain-based learning is presented along with ideas of ways each can be incorporated into the classroom.  
<http://www.unocoe.unomaha.edu/brainbased.htm>
- Sampled Layered Curriculum Units  
Numerous units in all content areas for secondary students utilizing the layered curriculum concept are available on this site.  
<http://help4teachers.com/samples.htm>
- 12 Design Principles Based on Brain-based Learning Research  
A brief list of principles from brain research that can directly apply to the classroom is presented in this article.  
<http://www.designshare.com/Research/BrainBasedLearn98.htm>

#### Books

- Gregory, G.H., & Chapman, C. (2002). *Differentiated Instructional Strategies*. Corwin Press: Thousand Oaks, CA  
This book is abundant with a myriad of activities that can be adapted and used to meet the varying needs of students.

- Kagan, S. & Kagan, M. (1998). *Multiple intelligences: The complete MI book*. Kagan Cooperative Learning: San Clemente, CA.  
This book ties in brain-based research with cooperative learning strategies. There are ample ideas and activities that a teacher can incorporate to reach each student.
- 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. This book also examines the different memory paths.

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By: Dr. Karen Walker, University of Maine, Farmington

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