



More power with visual & multi-sensory processing

Backgrounder #2 for the February 17, 2012 CISVA presentation:

An Image of 21st Century Learning: more power with whole-brain teaching

Presented by Susan Close

The principal activities of brains are making changes in themselves.

Marvin L. Minsky

1. We do not see with our eyes... we see with our brains...

Vision is probably the best single tool we have for learning anything. The brain devotes about half of its precious resources to vision.

- The more visual the input becomes, the more likely it is to be recognized – and recalled.
- **Text and oral presentations** are not just less efficient than pictures for retaining certain types of information; they **are WAY less efficient**. If information is presented orally, people remember about 10 percent, tested 72 hours after exposure. That figure goes up to 65% if you add a picture.

2. Why pictures grab attention...

- **We pay a lot of attention to colour...to orientation, to size...**
- We pay special attention if an **object in motion...**

3. Professionals everywhere need to know about the **incredible inefficiency of text-based information, and the incredible effects of images**

- We learn and remember best through pictures, not written or spoken words... Simple, two-dimensional pictures are quite adequate...if drawings are too complex, they can distract from the transfer of information.

4. Developing imagery while reading – followed by drawing – allows the learner to recall imagery, and helps the student to express thinking with language

- **By using drawing as a comprehension tool we slow down and allow all students to** use their mental constructs to help them develop images of the passage. Drawing may be what allows them to image text (Pressley, 2006; Bell, 1991; Manitone and Smead, 2003; Siegel, 2007)

5. Stimulate more of the senses at the same time.

- **Our senses evolved to work together...**which means we learn best if we stimulate several senses at once.

Groups in multi-sensory environments always do better...They have more accurate recall. Their recall has better resolution and lasts longer, evident even 20 years later. Problem- solving improves.

- **When touch is combined with visual information, recognition learning leaps forward by almost 30%...**

The benefits of multisensory inputs are physical as well. Our muscles react more quickly, our threshold for detecting stimuli improves, and our eyes react to visual stimuli more quickly.

- **Extra cognitive processing -- at the moment of learning -- makes learning better... Thinking and talking about an event, immediately after it has occurred** enhances memory... loss is lessened by deliberate repetitions... **deliberate re-exposures more elaborately in fixed intervals makes retrieval most vivid.**



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- **Activating multiple pathways** helps the learner integrate the new material with prior information... The extra information **adds more elaboration** through **thinking in different ways** and through **talking to explain understandings**.

When the processing includes **summarizing – orally and/or in writing – or the generating of a keyword gist**, learners **clear their working memories and develop metacognitive control...** before moving on to learn new information (OECD,2010).

- **Chunking matters...**

Learning occurs best when new **information is incorporated gradually into the memory store** rather than when it is jammed in all at once. When learners attend to a chunk of knowledge, other chunks of knowledge (content and process) nearby in the memory network are activated, like a ripple effect... this **spreading activation** brings dormant knowledge into focus in working memory, and supports processes the learner is using to create new information... the content and processes comprise a huge proportion of what the learners think about, how they think, and how they self-regulate to achieve the task and their personal goals...(Winne, 2011)

6. What flows through your attention sculpts your brain...

- Controlling your attention may be the single most effective way to shape your brain...You can train and strengthen attention like any other mental ability; ***mindfulness is well-controlled attention...developing mindfulness depends on improving regulation, learning, and selection in your brain...***

Attention has three aspects to it: **keeping information in awareness, updating awareness with new information, and seeking the right amount of stimulation...**

Information is held in working memory... steady stimulation keeps the gate closed... The gate gets opened by either a decrease or an increase in stimulation, which allows new information to surge into working memory, closing the gate behind it (Hanson & Mendius, 2009). A sequence that includes: generating images and details, explaining understandings to a partner and refining ideas, and generating a key word gist (a caption or headline for the information) serves to empty working memory and create new space for processing further information (Close, 2012; OECD, 2011).

7. Why the focus on imagery?

- **The generation of verbal and visual associations between text and experience increased comprehension by 50%...** Imagery provided the most opportunity for retrieval of information from long-term memory (Kossly, 1976; Wittrock, 1981; Bell, 1991).
- **Imaging is critical to the actual thought process... stimulating imagery develops expressive speech...** individuals using images from which to speak become more organized in their expressive language. They are more concise and more able to monitor their language for relevance and sequential/logical thought and expression (Wepham, 1976; Bell, 1991)

8. Findings on how multi-media exposure affects humans (Medina, 2009):

- **People learn better from pictures and words**, than from words alone.
- People learn better when corresponding **pictures and words are presented simultaneously**.
- People learn better when corresponding **pictures and words are presented near each other rather than far from each other on the page or screen**.



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- People learn better when **extraneous material is excluded**

9. When we combine novelty and challenge with social relationships, we build attachment to learning and bonds between people.

- Our social connections with one another shape our neural connections that form the structure of the brain. This means that the way we communicate alters the very circuitry of the brain (Hanson & Mendius, 2009).
- Networks in your brain's perceptual-motor systems light up both when you perform an action and when you see someone else perform an action, giving you a **felt sense** of what (s)he's experiencing (Oberman and Ramachandran, 2007). ... the limbic networks that produce your feelings also make sense of the feeling of others (Niedenthal, 2007).
- Empathy, encouragement and caring from others – especially in childhood – are internalized in neural networks that support feelings of confidence and worth...
- **The more varied the learning strategies, the more brain branching occurs** – especially in the **first hour of exposure** to the tasks and content being developed. (Siegel, 2011, 2009, 2007, 2003; Willis, 2008; Medina, 2011, 2009).

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