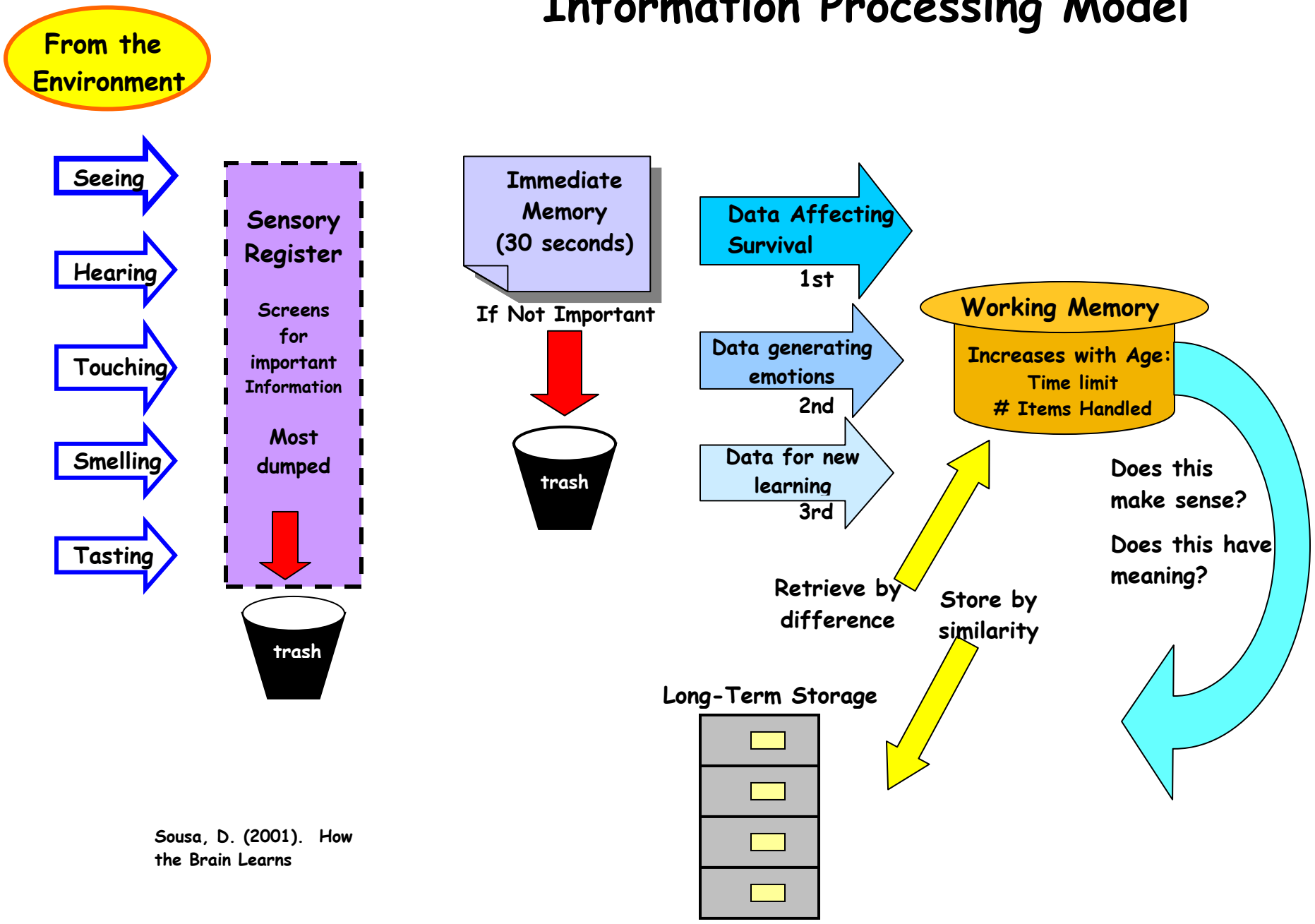
Information Processing Model



Sousa, D. (2001). How the Brain Learns

Academie Da Vinci Charter School for the Arts

Staff Development Series

Susan Ray, Principal / Presenter

Brain-Based Learning - Teaching Principles

1. The brain is a complex adaptive system.
2. The brain is a social brain.
3. The search for meaning is innate.
4. The search for meaning occurs through patterning.
5. Emotions are critical to patterning.
6. Every brain simultaneously perceives and creates parts and wholes.
7. Learning involves both focused attention and peripheral attention.
8. Learning always involves conscious and unconscious processes.
9. We have at least two ways of organizing memory.
10. Learning is developmental.
11. Complex learning is enhanced by challenge and inhibited by threat.
12. Every brain is uniquely organized. (Caine and Caine 1997)

Three Conditions for Learning

1. **Orchestrated Immersion:** the teacher becomes the orchestrator, or the architect, designing experiences that will lead students to make meaningful connections. Consider this account:

Finally, exasperated, she had them put on their coats and follow her outside. She told them, "I am going to read to you and I want you to walk around in a circle. When I say ‘comma’ I want you to slooow down, whenever I say ‘period’ I want you to stop dead in your tracks, and when I say ‘exclamation mark’ I want you to jump up and down…." She tried this for five minutes with perfect success. When they went back inside and read, all of them slowed down at the commas, paused at periods, and used emphasis at exclamations points.

2. An optimal state of mind that we call **relaxed alertness**, consisting of low threat and high challenge.

3. The regular, **active processing** of experience as the basis for making meaning.

Putting It Together

Albert Einstein said, “Learning is experiencing. Everything else is just information,” suggesting that we must “experience” learning by utilizing our twenty or more (not just five) sensory systems.

Human beings have an innate need to see, touch, taste, feel, and hear (experience) the features of any new object in order to understand it better.

When the brain encodes new concepts through various learning modalities, (1) those concepts are processed and stored in several interconnected neural networks, thus enhancing the power of a specific memory.

A single neuron can make as many as 50,000 connections with other neurons in their effort to dissect, decipher and encode the outside world.

Those neurons rely on neural pathways – 90% developed in the first 8 -10 years of life- to link those connections and help information travel to memory areas of the brain.

If those pathways are NOT developed early, learning is delayed or impaired.

The more frequently that neurons linked together fire together, the greater is the likelihood that they will fire in unison on a subsequent occasion, which results in permanently hardwiring together, a process we call learning.

Since it often takes six exposures (hearing, saying, touching, seeing, etc.) before new information enters into permanent memory for storage, combining multi-sensory experiences with multi-modal teaching approaches will accommodate nearly all learning styles.

Well-entrenched (practiced) behaviors later become centered in the sub-cortical and cerebellar regions freeing up the conscious cerebral cortex for new learning, as deep-rooted skills no longer demand a learner's full attention for their execution.

Subsequent learning opportunities are made possible based on what Russian psychologist Lev Vygotsky referred to as zones of proximal development. Vygotsky believed that when a student is at the ZPD for a particular task, providing the appropriate assistance (scaffolding) will give the student enough of a "boost" to achieve the task. Once the student, with the benefit of scaffolding, masters the task, the scaffolding can then be removed and the student will then be able to complete the task again on his own. (Think of a gymnastics coach "spotting" a tumbler, then not spotting).

There are more neural networks representing one's strengths than there are for deficiencies or weaknesses. Unfortunately, schools spend inordinate amounts of time ferreting out and "correcting" deficiencies, rather focusing on enhancing one's strengths.

Most human beings find learning easiest when they begin a learning experience with a hands-on, minds-on activity coupled with whole-body integrative movements.

Our brain and skin are initially part of the same primitive formation during prenatal development, but they are separated during neurogenesis. Thus, in a sense, our skin is the "other half" of our brain. This, perhaps, explains why at nearly all stages of life, one learns a great deal about his environment (objects, another person, etc.) via our universal human preference "to touch to learn" more about an object.

Sustained immobility in the classroom is as incompatible with life as it is incongruous with human growth and human learning.

Combining mobility with hands-on learning in a cooperative learning setting, where learners communicate their ideas with one another appears to be the best equation for yielding the greatest learning results.

Scientists discovered that the power of a brain grows in direct relationship with the number of cells it has. The secret is the total number of brain cells and the number of connections between them.

Those connections are a direct result of a variety of experiences that engage the senses, particularly touch.

Gardner's *Multiple Intelligences* are methodologies to develop/use various neural pathways. These experiences must differ for children with differently-preferred learning styles.

Simplest way to vary a lesson with learning styles: Use the KAV-R/W method. This means:

- kinesthetic methods (touch/move);
- audio (hear/listen); and
- visual (see/ write/read).

Some learners listen best by doing some tactile activity: doodling, notes, etc.

Try something NEW this week!