The Neuroscience of Stories – Curtis Kelly

**Topic 5: The power of stories**

What is it about stories that so captivates our students?  We have long known that stories are powerful teaching tools.  Neuroscience is finally starting to tell us why.

In terms of retention, research shows information delivered in stories is better learned than through other means, such as explanations, lectures, and even TV.  Oaks (1995) compared retention from traditional lectures to storytelling.  He found that even after five weeks, about twice as many people in the group hearing the stories still remembered the key points.  Berkowitz and Taylor (1981) found children recalled significantly more information from the narrative passages than they did from expository passages with similar content. George and Schaer (1986) found kindergarten children's recall of prose content was significantly higher when given by storytelling than other means, including *television*!

One might conclude we retain more from stories because they are inherently more interesting, so researchers from University of California tested for this (Graesser et al, 1980). As expected, narrative texts were read about twice as fast as the expository texts and remembered twice as well, with the correlation between narrativity and the amount of information recalled (0.92).  Not expected was that familiarity and interestingness had a very small effect on either speed or retention. As we will see later, there is something special about the narrative format, regardless of the content.

Stories can be actively used by the learners as well. In two studies (Bower & Clark, 1969; Higbee, 1977) people were given word lists to memorize.  Half were told to memorize them any way they wanted and the other half were told to put the words in stories. The stories group showed far better retention.  How much better?  They remembered from two to seven times as many words.  Amazing!  Imagine if you could get your students to remember twice as many vocabulary items and that was just the worst case.

How does neuroscience explain this?  As discussed earlier, the reticular activating system in cohort with other areas tags information with personal relevance and emotional valence as important to remember.  Stories that arouse emotion do so through the release of three important neurotransmitters: a) dopamine - the neurotransmitter of drive, reward, and deeper learning; b) Cortisol, the stress hormone associated with distress and focus; and c) everyone’s favorite, oxytocin, the neurotransmitter associated with bonding. Neuroscientist Paul Zak (2015) has been doing amazing research on cortisol and oxytocin release caused by moving stories.  He found that touching stories cause the release of both, resulting in greater attention, more sympathy, and changes in attitudes.  Because of oxytocin release, Zak’s subjects were more willing to give money to strangers after seeing a touching story. Zak found something else out too.  The information must be structured a particular way for these neurotransmitters to be released, a structure you know: the arc of the rising action, climax, and falling action that stories are made of.

Once again, we find that not just the content, but also the format of a story that affects the brain.  Why does narrative organization, where events occur one after the other have such a great impact on learning?  The answer is that because that is how we are wired (Widrich, 2012). “A story, if broken down into the simplest form is cause and effect. And that is exactly how we think. We think in narratives all day long, no matter if it is about buying groceries, whether we think about work or our spouse at home. We make up (short) stories in our heads for every action and conversation” (p.1).  If I do this, then I hope to get this result. This is an unconscious, uncontrollable process, even when we are asleep. Our brains are prediction machines.

Our brains are built to remember things that are important to us.  Stories are important because they are encapsulated experience. As E.O. Wilson puts it, “The stories we tell ourselves and others are our survival manuals” (2002). They help decode the world, exploit our environment and hone our social skills. Mar and Oatley (2008), reported in two studies that individuals who frequently read fiction seem to be better able to understand other people, empathize with them and see the world from their perspectives.

Fiction, Oatley notes, “is a particularly useful simulation because negotiating the social world effectively is extremely tricky, requiring us to weigh up myriad interacting instances of cause and effect. Just as computer simulations can help us get to grips with complex problems such as flying a plane or forecasting the weather, so novels, stories and dramas can help us understand the complexities of social life.” (p.42)

The success of our species is mainly due to the way we have made these manuals of encapsulated experience transferrable.  Uri Hasson from Princeton examined the brains of someone telling a story and someone listening, and found something surprising.  Their brains linked up (Widrich, 2012). When the teller “had activity in her insula, an emotional brain region, the listeners did too.  When her frontal cortex lit up, so did theirs. By simply telling a story, the woman could plant ideas, thoughts and emotions into the listeners’ brains” (p.1).

We must respect the power of stories.  One of the greatest changes in language teaching in the last 20 years has been the spread of extensive reading (ER).  Advocates have long said ER causes language learning because a) it is comprehensible, b) it builds automaticity c) and it increases learner exposure to the language (Richard Day, personal communication, 2004).  They might also add, as an aside, that since reading is pleasurable, students are more likely to keep doing it.  Neuroscience paints a different picture.  After all, most of what language students do is comprehensible, builds automaticity, and increases exposure to the language.  Instead, what makes ER particularly effective is that our brains are built to remember information in the narrative format, and even more so if it arouses emotion.

Berkowitz, S., & Taylor, B. (1981). The effects of text type and familiarity on the nature of information recalled by readers. *Directions in reading: Research and instruction*, 157-161.

Bower, G. H., & Clark, M. C. (1969). Narrative stories as mediators for serial learning. *Psychonomic Science*, 14(4), 181-182.

George, Y., & Schaer, B. (1986). An investigation of imposed-induced imagery methods on kindergarten children's recall of prose content. (ERIC Document Reproduction Services No. ED 278974).

Graesser, A. C., Hoffman, N. L., & Clark, L. F. (1980). Structural components of reading time. *Journal of Verbal Learning and Verbal Behavior,* *19*(2), 135-151.

Higbee, K. L. (1977). *Your memory: How it works and how to improve it.* Prentice-Hall.

Mar, R. A., & Oatley, K. (2008). The function of fiction is the abstraction and simulation of social experience. *Perspectives on psychological science, 3*(3), 173-192.

Oaks, T. (1995). Storytelling: A natural mnemonic: A study of a storytelling method to positively influence student recall of instruction. Trace: Tennessee Research and Creative Exchange. Retrieved from http://trace.tennessee.edu/utk\_graddiss/2540/

Widrich, L. (2012). What listening to a story does to our brains. BufferSocial, November 29, 2012. Retrieved from https://blog.bufferapp.com/science-of-storytelling-why-telling-a-story-is-the-most-powerful-way-to-activate-our-brains

Wilson, E. O. (2002). The power of story. *American Educator, 26*(1), 8-11.

Zak, P. J. (2015). Why Inspiring Stories Make Us React: The Neuroscience of Narrative. *National Institutes of Health, Cerebrum*. 2015Jan-Feb; 2015: 2. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4445577/