

Laptops in the Classroom: Multi-tasking or Multi-distracting, & Is Half-witted Attention Enough?

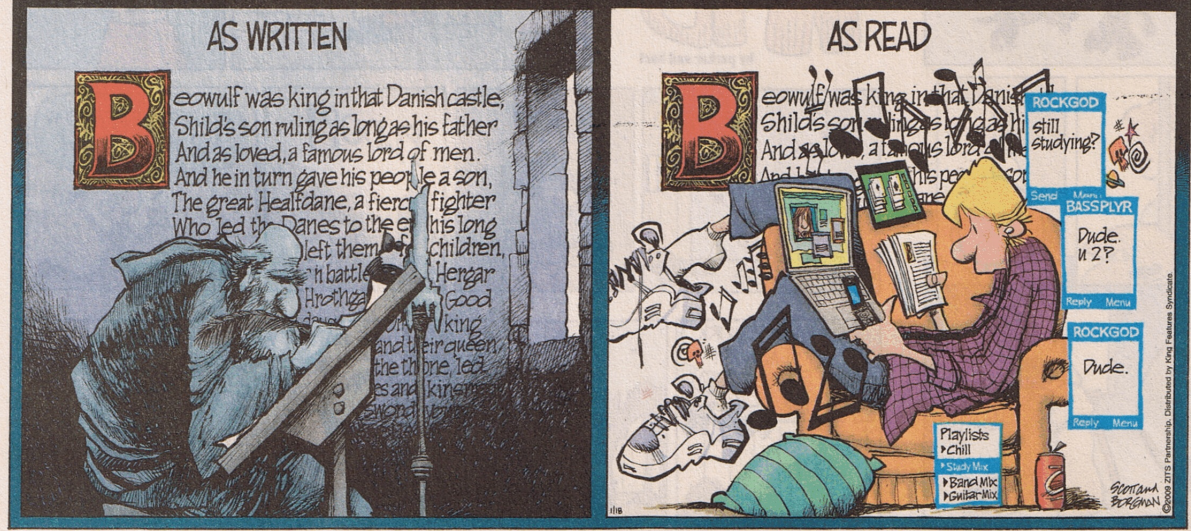


Jeff King, TCU

2010 TFDN Conference
Ft. Worth, TX | June 2010

ZITS/ by Jerry Scott and Jim Borgman

Classic Literature



The Essentials:

- Human brains have not yet evolved the ability to cognitively focus on two things at one time. Yes, you can walk and chew gum at the same time or hum absent-mindedly while you daydream, but only because you're using different parts of your brain to do those two things. Try this: think of an elephant reading a book and the mathematical formula for finding the average of a list of four numbers at the same time. See?
- When people claim they are multi-tasking, they are really task switching.
- Task switching comes at a price in two ways:
 - It takes your brain some “ramp-up” time to get back to a focus on the task you switched away from. This further limits your attention on that task.
 - Your brain, in its attempt to toggle back and forth during task switching, suffers what some neuroscientists have termed a “brown-out”—neither task receives the mental energy that you could devote to a single task.
- People who claim to be great at multi-tasking are actually worse at task-switching than people who like to focus on one thing at a time.
- Human brains have evolved to notice distractions and pay attention to them (that flash of color

might be a tiger on your tail!). If you load your environment with multiple distractions, your brain will try to do exactly what has helped humans survive through the millennia: attend to the distractions. This limits your ability to focus on one thing (such as you need to do during deep learning).

- Evidence is accumulating that the primary type of brain activity that you can muster in the midst of multiple distractions is activity generated in the striatum, a part of the brain suited for repetitive, surface learning (e.g., memorizing) as opposed to the focus you can muster using the neocortex when you are paying attention in an effort to learn.
- You must help your students understand this because **THEY ALL BELIEVE THEY ARE GREAT MULTITASKERS!** The first day of class is the perfect time to demonstrate how inefficient multitasking is, why you've chosen your laptop policy, and how students benefit by focusing on the topic at hand.

RESOURCES

“Mental Brownout” – Just, M. A., Carpenter, P. A., Keller, T. A., Emery, L., Zajac, H., & Thulborn, K. R. (2001). Interdependence of nonoverlapping cortical systems in dual cognitive tasks. *NeuroImage*, 14, 417-426. (Carnegie Mellon)

“Striatum” – Foerde, K., Knowlton, B. J., & Poldrack, R. A. (2006). Modulation of competing memory systems by distraction. *Pro-*

ceedings of the National Academy of Sciences, 103(31),11778-11783. (UCLA)

“Task Switching” – Rubenstein, J. S., Meyer, D. E., & Evans, J. E. (2001). Executive control of cognitive processes in task switching. *Journal of Experimental Psychology: Human Perception and Performance*, 27, 763-797. (Univ. of Michigan)

“Specific Research about Laptops in Class” – Hembrooke, H., & Gay, G. (2003). The laptop and the lecture: The effects of multitasking in learning environments. *Journal of Computing in Higher Education*, 15(1), 46-65. (Cornell)

“Self-described ‘Multitasking’ Experts Are Not” – Ophir, E., Nass, C., & Wagner, A. D. (2009, September 15). Cognitive control in media multitaskers. *Proceedings of the National Academy of Sciences*, 106(37), 15583-15587.

If you’re interested in developing your skill at NOT multitasking (i.e., developing your “monotasking focus”):

Rapt: Attention and the Focused Life. Winifred Gallagher, 2009.

Buddha’s Brain: The Practical Neuroscience of Happiness, Love and Wisdom. Rick Hanson with Richard Mendius, 2009.

The Power of Mindful Learning. Ellen Langer, 1998.

Mindfulness. Ellen Langer, 1990.