Technology, Distractibility and the Classroom

Monday, July 16, 2018

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The original version of this post was published at The Learning Scientists (http://www.learningscientists.org/blog/2017/9/27-1) on September 27, 2017.

This is the third in a series of three posts, which all focus on a different type of noise and distraction, and their effects on learning.

I recently had the opportunity to observe instruction in a first-grade classroom. The teacher was
giving a vocabulary lesson in which she taught children words that could be divided into two
categories: words that contained the “AU” vowel sound found in the word “couch”, and words that
contained the “AW” vowel sound found in the word “crawl”. To teach this distinction, the teacher
used an activity that involved a smartboard. The board showed a bank of words that the children
were asked to assign to one of the two vowel sound categories by dragging the word to the right or
left side of the screen. In general, it seemed to be a good, educational activity—the teacher was
providing many examples of words containing those sounds and breaking them down into their
smaller sound components, and sometimes calling on children to assign a particular word to one of
the two groups. The children seemed generally engaged. But one thing immediately caught my
attention: the two locations on the smartboard that corresponded to the two different word categories
(AW and AU words) were marked by a hypnotic swirling black and white whirlpool animation.
Presumably, this animation was picked because it was attention-grabbing and visually appealing, but
there can be a fine line between designing an activity to be fun and child-friendly, and potentially
distracting children from the main point of the lesson. I can only imagine that if I as an adult had
trouble tearing my gaze away from this animation, the first-graders likely found it even more difficult.

Technology is in many ways a double-edged sword. It can be used to create remarkable interactive
lessons that can adapt flexibly to a learner, which can be a particularly powerful tool considering how
many children an instructor must try to simultaneously teach. But, when incorrectly applied, it can
involve many flashy distractions that are extraneous to the fundamental lesson at hand. This is
supported by research. For example, as I mentioned in a previous post, a study that looked at 3-year-
olds’ ability to understand and remember a story presented in an e-book found that children
struggled to follow and remember the story when extraneous “bells and whistles” were included
compared to a simpler version (1 (https://onlinelibrary.wiley.com/doi/full/10.1111/mbe.12028)). This
phenomenon is not restricted to more advanced technology: a different study found similar results
when comparing letter learning in 30- to 36-month-olds. Children who read a standard, relatively plain
type of children’s book learned more letters than children who encountered a book with many
manipulative features such as flaps, levers, and textures. Evidently, although children may have
enjoyed playing with the flaps and levers, it appeared to distract them from really engaging with
learning the letters (2 (http://journals.sagepub.com/doi/abs/10.1177/1468798411430091)). Thus,
although there may not be anything unique about the potential for cutting-edge electronic technology
to serve as a source of distraction, its power and flexibility to create attention-grabbing images and
multimedia may make it particularly distracting and damaging to student engagement.

Despite the potential dangers for distraction, correctly leveraged technology can be a tremendous
asset to teachers and classrooms. Well-designed computer activities and lessons can provide
support to teachers who must simultaneously address the needs of many different students with
limited resources. Take as an example the cognitive tutors that are continuing to be developed and
refined, which adapt to the needs of individual students by tracking the kinds of mistakes they make
to support and strengthen whatever skills may be weak (for a review of early research on cognitive
tutors, see (3 (https://www.tandfonline.com/doi/abs/10.1207/s15327809jls0402_2))). As these
technologies become more and more sophisticated, the potential for technology to aid education will
presumably only grow. However, as cautioned by Hirsh-Pasek and colleagues (4
(http://journals.sagepub.com/doi/abs/10.1177/1529100615569721)) in a recent article about the
proliferation of tablet and phone apps marketed as educational, it is critical to use insights from the
science of learning to guide the design of these apps if they are truly to support education. Just as
the Food and Drug Administration has a set of guidelines foods must meet to be labeled “low-fat”,
perhaps an analogous set of standards should be developed to regulate the use of the word
“educational” to describe apps marketed toward parents of young children.
Four Pillars of Learning

As put forth by Hirsh-Pasek and colleagues (http://journals.sagepub.com/doi/abs/10.1177/1529100615569721) to guide responsible creation of “educational” apps, humans learn best when they:

- Are actively involved, or “minds-on” with the task or learning materials
- Are engaged with the task or learning materials rather than distracted by peripheral elements
- Derive meaningful experiences that connect to their lives
- Have high-quality social interactions connected to the task or learning materials within the context of a clear learning goal

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- https://www.tandfonline.com/doi/abs/10.1207/s15327809jls0402_2