



Views You Can Use

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I have the pleasure of letting you know about a new book written by one of our keynote presenters, Bill McNeal. *A School District's Journey to Excellence: Lessons from Business and Education*, co-authored by Tom Oxholm, is about how one of the nation's largest school districts significantly improved student achievement and remarkably changed its school culture during a 10-year period. The book, which blends business principles with leadership skills for educators, is a practical guide that is filled with lessons and tips for success, case studies, and data. The book is available on Amazon.com, Barnes & Noble, and elsewhere. To inquire about presentations by Mr. McNeal, please contact Karen@daggett.com.

Sincerely,

Bill Daggett

Brain Research Trends

A Computer that Can Read Your Mind

A computer model has been designed to "read" people's minds by processing scans of their brains as they think about specific words. The project, conducted at Carnegie Mellon University, brings scientists closer to discovering the connections between thoughts and activation patterns of the brain and could lead to better treatments for language disorders and learning disabilities.

The researchers used functional magnetic resonance imaging (fMRI), a brain scanner that allows researchers to see real-time brain activity. They built a computer model that took the fMRI activation patterns for 60 concrete nouns that were broken down into 12 categories, which included animals, body parts, buildings, clothing, insects, vehicles and vegetables. The model also analyzed a set of texts that contained more than a trillion words, focusing on how each noun was used in relation to a set of 25 verbs associated with sensory or motor functions. Combining the brain scan information with the analysis of the text corpus, the computer then predicted the brain activity pattern of thousands of other concrete nouns. The computer can predict what each participant's brain activation patterns would look like when each person thought about these words, even without having seen the patterns associated with those words in advance.

Source: <http://esciencenews.com/articles/2008/06/02/a.computer.can.read.your.mind>

How Memory Works in Young Children

Telephone and Social Security numbers typically are broken up with hyphens, blank spaces, or other type of separator for good reason. Adults can recall the information more efficiently when the numbers are presented in small groups. Now researchers at the Johns Hopkins University have discovered that children as young as 14 months use the same technique of breaking up information into smaller pieces to increase their working memories. The research findings indicate that "chunking" information in this way is not a learned strategy but is, instead, a fundamental aspect of the human mind. The findings may have implications for education strategies or for helping those who suffer short-term memory problems. But more directly, they show that the memory systems of young children are surprisingly similar to those of adults.

"What we have done is show that very young children, who can usually only keep track of about three objects at once, can keep track of more if they use the kind of conceptual, linguistic, perceptual, and spatial cues adults also use," said Lisa Feigenson, an assistant professor of psychological and brain sciences who worked on the study. The results also suggest that memory, even in toddlers, constantly is being restructured and reorganized to maximize its efficiency.

Source: www.sciencedaily.com/releases/2008/07/080714172155.htm

The International Center will soon publish two resource kits in conjunction with The Center for Effective Learning: How Brain Research Impacts Instruction for grades K-6 and grades 7-12.

Nanobiotechnology Trends

Safer Foods with Edible Sensors

Imagine an edible optical sensor that could be placed in produce bags to detect harmful levels of bacteria and consumed right along with the vegetables. Scientists at Tufts University's School of Engineering have demonstrated for the first time that it is possible to design such "living" optical elements that could be part of an entirely new class of sensors. These sensors would combine sophisticated nanoscale optics with biological readout functions, be biocompatible and biodegradable, and be manufactured and stored at room temperature without the use of toxic chemicals. The researchers used fibers from silkworms to develop the platform devices. Such sensors would greatly expand the use of current optical technologies in such areas as human and livestock health, environmental monitoring, and food quality, the researchers say. For example, at a low cost, a bioactive, biodegradable silk film could be put in every bag of spinach to give the consumer a readout of whether or not *E. coli* bacteria are in the bag.

Source: www.sciencecodex.com/edible_optics_could_make_food_safer

Deterring Gun Crime

Criminals who use firearms may find it much harder to evade justice in future, thanks to a new bullet tagging technology developed in the United Kingdom by an international team of chemists, engineers, sociologists, and nanotechnologists. Nanotags, about 30 microns in diameter and invisible to the naked eye (one strand of hair is about 300 microns in diameter), are designed to be coated onto gun cartridges. They then attach themselves to the hands or gloves of anyone handling the cartridge and are difficult to wash off completely. Some of the nanotags also remain on the cartridge even after it has been fired. This would make it possible to establish a forensic link between a cartridge fired and whoever handled it. To date, it has been hard to establish such a link because of the difficulty in retrieving fingerprints or significant

amounts of DNA from cartridge surfaces. The nanotags are made from pollen, which has strong adhesive properties. The pollen is coated with titanium oxide or a mixture of other oxides. The precise composition of the coating can be varied from one batch of cartridges to another, enabling a firm connection to be made between a particular fired cartridge and its user.

Source: www.epsrc.ac.uk/PressReleases/GuiltOnTheirHands.htm

Biotechnology Trends

Halting the Aging Process

Scientists at the Stanford University School of Medicine may have discovered the first step in halting or even reversing the ravages of age. They have found that specific genetic instructions drive aging in worms. The finding contradicts the prevailing theory that aging is a buildup of tissue damage that is akin to rust. The researchers examined the regulation of aging in *C. elegans*, a millimeter-long nematode worm whose maximum life span is about two weeks. The scientists used microarrays, silicon chips that detect changes in gene expression, to hunt for genes that were turned on differently in young and old worms. They found hundreds of age-regulated genes switched on and off by a single transcription factor called elt-3, which becomes more abundant with age. Two other transcription factors that regulate elt-3 also changed with age. Transcription factors are proteins that bind to specific parts of DNA.

To see whether these signal molecules were part of a wear-and-tear aging mechanism, the researchers exposed worms to stresses thought to cause aging, such as heat (a known stressor for nematode worms), free-radical oxidation, radiation, and disease. But none of the stressors affected the genes that make the worms grow old. If aging is not a cost of unavoidable chemistry, but is instead driven by changes in regulatory genes, it is theoretically possible to slow down or stop the aging process, the researchers say.

Source: http://med.stanford.edu/news_releases/2008/july/aging-worm.htm

Many tips for keeping the human brain healthy can be found in my new book, What Brain Research Teaches about Rigor, Relevance, and Relationships, co-authored by leading clinical neuropsychologist Paul Nussbaum.

Education Trends

3-D Video Game Launched to Spur Student Interest in Science

The Federation of American Scientists (FAS) has launched the first in a series of three-dimensional educational video games designed to spur student interest in science. Designed as a supplemental learning tool, Immune Attack™ introduces basic concepts of human immunology to high school and entry-level college students through visual elements and simulations. To play the game, users control a microscopic robot to navigate through a 3D body, completing a series of missions to detect a bacterial infection and activate the appropriate defensive immune cells. These missions follow the actual biological process that occurs during an infection and how immune cells are stimulated to kill the bacteria.

Sources:

www.bio-medicine.org/biology-news-1/Fixing-the-education-digital-disconnect-one-video-game-at-a-time-3396-1/
<http://fas.org/immuneattack/technical-support>

By the Numbers

According to a new study from the Pew Internet & American Life Project, teens still rule compare to adults when it comes to embracing interactive online media.

- Nearly 65% of youths ages 12-17 have created some form of online content.
- Only 8% of adults have created a blog; 28% of teens have.
- While 55% of teens have a profile on an online social network such as Facebook or MySpace, only 20% of adult users do.
- When it comes to creating or working on their own Web pages, 27% of teens have compared to 14% of adults.

Other interesting statistics from the report include:

- Teens from single-parent or lower-income households are more likely to blog than affluent teens in more traditional households.
- Boys post more video files and play more online games, while girls dominate the blogosphere and photo posting.
- Although e-mail is losing popularity to social networking sites, such as Facebook and MySpace, face-to-face contact still matters.

Source: *Teacher Magazine*, Feb. 10, 2008

Students are way ahead of educators when it comes to technology. In a DVD titled Making Common Sense Common Practice in Educating All Learners, International Center Senior Vice President Ray McNulty encourages educators to embrace technology as a way to enhance student engagement and classroom instruction.