

Views You Can Use Vol. IV No. 5

In this monthly briefing memo that you have requested, my colleagues at the International Center for Leadership in Education and I share information on trends and technologies that will have an impact on education.

We wish you a wonderful Thanksgiving holiday.

Sincerely,
Bill Daggett

Information Technology

Digital Hanks

The Tom Hanks' movie based on the award-winning children's book *The Polar Express* has taken computer animation to new levels. A technology called "Performance Capture" allows actors to perform — not just do voice-overs — in computer-animated movies. Initially, Performance Capture animators create settings and backgrounds using sophisticated software. These digital "sets" are then re-created life-size, using chicken wire frames embedded with infrared receivers. Actors perform their roles scene-by-scene within those skeletal sets, wearing sensors on clothing and face so the receivers can capture actual motions and facial expressions. The computerized moving outlines are then "fleshed out" to create very human-like animations. A simpler form of this process was used in *The Lord of the Rings*, *Toy Story*, and *Forrest Gump*.

Applications of this technology could move beyond arts and entertainment to robotics, healthcare, and physical training and rehabilitation. Trained computer animators are much in demand in the workforce.

Source: Edward Douglas, "The Cutting Edge Animation of Polar Express," *comingsoon.net*, September 20, 2004 posted on <http://comingsoon.net/news/topnews.php?id=6440>

Arrive Alive?

In what many teen drivers will likely consider to be the worst application of satellite positioning technology yet, parents can now track their every turn of the wheel. Teen Arrive Alive uses a global positioning chip in a cell phone to record and transmit to a home computer the teenager's location, direction, and speed. The monthly fee for the service is \$15. Promoters see the system as a way of keeping safe a population that has a high percentage (78%) of drivers ticketed or involved in car crashes. Opponents consider it an intrusion of privacy and a sign of a lack of parental trust. As always, we need to "mediate" technological innovations to balance what *can* be done with what people feel *should* be done.

Sources: *FOX News*, November 8, 2004 and *Teen Arrive Alive* online at www.teenarrivealive.com

Virtual Concerts

The McGill University (Montreal) Faculty of Music's Center for Interdisciplinary Research in Music Media and Technology is using the Internet to engineer and deliver live concerts in surround sound, with full-screen video and multi-channel communications systems. Webcast concerts will originate from high-tech studios, but will enable music fans around the world to enjoy their favorite performers from local virtual concert halls. Researchers at McGill are also looking for ways to integrate "haptic" (based on the sense of touch) data into the virtual concert experiences. This

emerging technology would capture “environmental vibrations” felt – not just heard – by both musicians and audiences during live performances. Maybe that’s what the Beach Boys meant by “Good Vibrations.”

Source: Maclean’s 100 Leaders and Dreamers. Rogers Publishing, Fall 2004

Nanotechnology

Bloomin’ Nanos

When liquid metal gallium nitrate — used to treat hypercalcemia (too much calcium in the blood) that may occur with some types of cancer — is vaporized under high heat and pressure, a beautiful phenomenon occurs. The resulting droplets condense on silicon wafers into ultra-tiny silicon carbide wires that bond together to look remarkably like bouquets of flowers. These clusters of “nanoflowers” are each about one one-hundredth the width of a human hair. Ghim Wei of Cambridge University has discovered that the “blooms” possess an amazing ability to repel water and capture light energy, traits that may have breakthrough applications as coatings and in solar cell technology.

Sources: Todd Jatras, “Beauty on a Nanoscale,” *Wired*, October 2004 and MedlinePlus, www.nlm.nih.gov/medlineplus/druginfo/uspdi/202254.html#SXX14

Biotechnology

Gobble Gobble. As Thanksgiving approaches, try our Biotech Turkey Test.

1. What do domestically produced turkeys eat?
2. How old are turkeys at maturity?
3. Are turkeys given drugs?
4. Do turkeys take steroids?
5. Is turkey irradiated?

Answers. **1.** Mainly corn and soybean meal, supplemented with vitamins and minerals. **2.** Turkeys grow to full maturity in about 4-5 months. **3.** In approving drugs for use in livestock and poultry, the Food and Drug Administration (FDA) sets legal limits for drug residues in meat and poultry and Food Safety and Inspection Service (FSIS) enforces those limits. Antibiotics may be given to prevent disease and increase feed efficiency but a “withdrawal” period is required before the bird can be slaughtered to assure that no residues are present in the bird’s system. **4.** No hormones have been approved for use in turkeys. **5.** In 1992, the USDA approved a irradiation of raw, fresh, or frozen packaged poultry to control certain common bacteria that can cause illness when poultry is undercooked or otherwise mishandled. Irradiated turkey is labeled accordingly.

Source: U.S. Department of Agriculture FSIS

Visit: www.fsis.usda.gov/OA/pubs/focustky.htm and www.butterball.com/en/index.jsp

Gas from Grass?

Even though rising oil prices are making ethanol and biodiesel “petroleum-extenders” more affordable, the high cost of petroleum alternatives has slowed their use. However, researchers are now discovering ways not only to reduce the cost, but also to expand the use of plants to produce biogenetic petroleum substitutes. By altering the genetic code of switch grass (*panicum virgatum*) with a specific strain of bacteria, scientists can produce PHB, a substance used to make plastic. The prolific three-to-eight foot-high weed, which pioneers encountered as they crossed the western prairies in the 1800s, is now grown as a decorative landscape grass. Switch grass may eventually become the raw material for a new type of biorefinery that produces fuel.

Such a breakthrough would mean less dependence on offshore oil and new opportunities for American farmers.

Sources: Renewable Fuels Association www.ethanolrfa.org/pr041101.html
Newsweek, September 20, 2004
Modbee.com www.modbee.com/business/story/9398849p-10306916c.html

Let the Fur-Balls Fly

Allerca Inc., a Los Angeles firm, is marketing genetically altered British Shorthair cats that will not cause allergic reactions in people (\$3,500 per kitty, if ordered in advance). By manipulating feline RNA, scientists can block the genes that produce the allergy-causing proteins that are normally excreted through a cat's skin and saliva.

Although this house pet application is exotic, the RNA-blocking technique to be used may eventually lead to a host of bionanotechnical applications in agriculture, medicine and health. We described the process of deactivating genes using "antisense" mRNA in the October issue of *Views You Can Use*.

Source: Earth Environment Services, *The Sunday Gazette*, Schenectady, NY, October 31, 2004

Listen to the Music

Neuroscientists are studying why human beings seem to have a biologically based love of music. Studies indicate that there is no single, specialized "center" in the brain for analyzing or appreciating music. Instead, several different parts of the brain appear to experience and process music in different ways. For example, the temporal lobe seems to be used to perceive and analyze melody; the frontal lobes seem to stimulate emotional responses to music. The size, capacity, and use of the music-related parts of a brain also seem to vary according to a person's musical experience, training and talent. Certain parts of musicians' brains appear to be "overdeveloped" as a result of their music making.

The ear has relatively few sensory cells – only about 3,500 – compared to around 100 million photoreceptors in the eye. Yet, the brain's capacity for music seems to be highly adaptable. It can be trained, re-wired, developed, and, yes, "tuned in" to process more musical input and output more effectively.

Studies like these remind us of the importance of providing pathways to educational success through fine arts.

Source: Norman M. Weinberger, "Music and the Brain," *Scientific American*, November 2004
www.sciam.com/article.cfm?chanID=sa006&articleID=0007D716-71A1-1179-AF8683414B7F0000&pageNumber=1&catID=2

Demographic Trends

Population Boom vs. Bust

United Nations Population Division research shows that, contrary to predictions from a few decades ago, the "population explosion" has gone bust. The global birthrate of nearly two percent calculated in the late 1960s has dropped to below 1.5 percent and is trending downward in forecasts continuing out past 2050. The trend includes such highly populated countries as India, China, Brazil, and Mexico. Next year, in fact, adults over 60 will outnumber children under four, as global life expectancies lengthen and worldwide birthrates continue to decline below the 2.1 children per woman, the "tipping point" needed just to maintain a population.

As we have been advising in our school and community partnerships, the implications of an “age-heavy,” baby-bust population will be significant for a shrinking, younger workforce and for exploding retirement and healthcare costs.

Source: *Wired*, November 2004

Education Trends

No Education Agenda Left Behind

The re-election of President Bush likely means that the *No Child Left Behind Act* will remain largely intact, with tweaks continuing as needed to address specific issues that arise – as has happened over the last several months, for example, with ESL learners and teacher quality issues. The Administration’s funding request for Department of Education discretionary spending in 2005 is a three percent increase, including a “Teacher Incentive Fund” to reward “effective” teachers, increased Pell Grants, encouragement of teacher professional development in math and science, additional funding for AP courses, and a refocus of Head Start more toward school readiness.

The Bush agenda has also indicated major support for expanding state testing requirements to include grades 9, 10, and 11 and mandated state participation in the National Assessment of Education Progress (NAEP) at grade 12.

The President’s plans support two additional concepts that the International Center has promoted for some time: individualized performance plans for entering high school students and help for struggling readers in both middle school and high school.

Source: *Education Week*, November 8, 2004

Special Education Note

The 4th Annual National Inclusive Schools Week will be celebrated on December 6-10 in classrooms, schools, and communities throughout the country. The week recognizes the nation's progress and promotes action towards increasing the capacity of schools and communities to provide a quality education to a diverse student population, particularly those who have disabilities. Information on Inclusive Schools Week and a celebration kit are available at: www.inclusiveschools.org/nisw04/info/welcome.htm.

Lessons from America’s Most Successful High Schools.

Our 2004 “best practices” research, conducted in partnership with the Council of Chief State School Officers (CCSSO) and other key national organizations, clearly indicated that a **safe and orderly school** was a major contributing factor to student achievement. Students learn best when a school environment is perceived to be nurturing and user-friendly, but also “under control.” Fort Mill High School in South Carolina uses a “sprint bell” to advise students traveling between classes that they have three-to-four minutes to get to class on time or they must go to the “lock out room.” Disruptive students are sent to a “time out room.” Repeated offenses (three times by the same teacher or four in total) result in an automatic four-hour Saturday detention. Students express appreciation for clearly stated behavioral guidelines, universally understand them, and – more importantly – know the reasons behind them.

By the Numbers:

- The U.S. ethanol industry produced an average 225,000 barrels per day in August 2004.
- About 20 percent more biodiesel fuel was purchased in the U.S. over the past year - a total of 30 million gallons.
- Known oil reserves are forecast to last only about 40 more years. Still, just 6 percent of U.S. energy now comes from renewable sources, including conventional hydropower and wood, according to the U.S. Department of Energy.
- Less than one percent of U.S. energy needs are met by alternative energy sources combined: wind, solar, and biofuel.
- The ethanol industry is expected to produce more than 3.3 billion gallons in 2004, up from 2.81 billion gallons in 2003.
- Currently, 81 ethanol plants have the capacity to produce more than 3.4 billion gallons annually. Fourteen additional plants are under construction.

Sources: Renewable Fuels Association www.ethanolrfa.org/pr041101.html
The Associated Press, November 8, 2004 as quoted in Modesto Bee Online
www.modbee.com/business/story/9398849p-10306916c.html