



Views You Can Use

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Education Trends

Using MP3 Technology to Learn Physics

Using an MP3 recording of Neil Armstrong, a group of 30 Italian high school students calculated the distance from the Earth to the moon. The students analyzed the conversation between Neil Armstrong on the moon's surface and ground control in Houston in which he utters his famous "one small step" speech. (The recording is available on the NASA website.)

The students noticed an echo in the recording in which sentences from Earth are retransmitted via Armstrong's helmet speaker through his microphone and back to Earth. They used the free audio editing program Audacity to measure the echo's delay, then used this data to work out the distance to the moon as 3.93×10^8 meters. (The actual distance varies between 3.63 and 4.05×10^8 meters). The students then measured the eccentricity of the moon's orbit using conversations recorded during the Apollo 17 mission, which was on the lunar surface for 300 hours. They also estimated their errors using the moon's ephemerides (approximate positions at regular intervals.) Likely errors include delays caused by electronics and the time it took for the signals to be routed to the various antennae around the world that NASA used for communications.

Sources: www.technologyreview.com/blog/arxiv/23205
arxiv.org/abs/0903.3367:

Technology and innovation in the classroom is one of the major strands in this year's Model Schools Conference in Atlanta on June 28-July 1. Topics include using technology to stretch students and increase engagement, accommodating learning styles using technology, and focusing on skills students will need to be innovative leaders. Please visit www.modelschoolsconference.com.

Career Ambassadors to Pump Up Student Interest in Science and Technology

To encourage more students to pursue science and technology careers, the British government and businesses have partnered to create the Science and Engineering Ambassadors program, in which company employees travel to schools to volunteer their time and share their professional experiences. The program has 18,000 volunteer "ambassadors" so far in the areas of pharmaceuticals, aerospace, defense, and high-tech material development. The number of volunteers is expected to reach 27,000 by 2011. More than half the ambassadors are under 35, and 40% are women. Through the program, the ambassadors run activities, support after-school clubs, and offer career advice and mentoring.

Source: www.ft.com/cms/s/0/2a05006e-1581-11de-b9a9-0000779fd2ac.html?nclick_check=1

Biotechnology

Star Wars Prosthetic Arm — from Science Fiction to Reality

Dean Kamen, who invented the Segway scooter and heads the DEKA Research & Development Corporation in New Hampshire, has developed a life-like prosthetic arm, fully equipped with a hand with four fingers and a thumb, forearm, elbow, and shoulder. The "Luke Arm," named after Luke Skywalker's prosthetic hand in *Star Wars*, is a strap-on device designed to be controlled by muscular movement in the wearer's remaining limbs. Now a new "targeted renevation" device, developed by Todd Kuiken of the Rehabilitation Institute of Chicago, allows the Luke Arm to be controlled by a person's thoughts.

Targeted renevation involves sensors and the transfer of residual nerves, in this case from an amputated arm into the chest of the patient, to provide more intuitive use of a prosthetic limb. Kuiken's device, which must be implanted, decodes the signals that tell the limb where to go and for what purpose. An amputee, for example, thinks about drinking a glass of water, and the arm automatically performs the task. The sensory feedback allows the person to sense how tightly he or she is gripping the glass. Working models of the arm are expected to be commercially available within a year.

Sources: www.newsweek.com/id/172566
www.foxnews.com/story/0,2933,464187,00.html

Global Trends

Medical Tourism — the Latest Outsourcing Boom

Medical tourism, once reserved for people seeking elective surgery who could afford a trip overseas, has expanded to not-so-well-off Americans, who are turning to foreign countries for better deals on procedures ranging from hip replacement to heart surgery. Now that hospitals, employers, and insurers are starting to embrace the practice in light of continuing skyrocketing medical costs in the United States, the medical tourism industry is expected to expand exponentially, from an estimated \$60 billion in 2006 to \$100 billion by 2012. Blue Cross Blue Shield of South Carolina, for instance, has started a subsidiary company, Companion Global Healthcare, to offer medical tourism services to individuals and businesses. Hannaford supermarkets in Maine recently added an international option for hip replacements to its health care plan.

The growing demand for lower cost procedures has fueled an increase in hospital construction, often in developing countries and targeted in part at foreign customers. Overseas care can be 60-80% lower than the cost of U.S. surgeries. For example, a heart bypass performed in India costs 1/13 the price in America, and procedures conducted in Mexico can cost 1/3 the U.S. price tag.

Sources: www.newsweek.com/id/169827/page/2
www.nytimes.com/2009/03/21/health/21patient.html?fta=y
<http://query.nytimes.com/gst/fullpage.html?res=9a01e1d71231f933a15756c0a9619c8b63>

Technology

Robot Makes Genuine Scientific Discoveries

Researchers in the United Kingdom have created a “robot scientist” that they believe is the first machine to have independently discovered new scientific knowledge. The robot, called Adam, is a computer system that fully automates the scientific process. Through this process, the robot discovered simple but new scientific knowledge about the roles of several unknown genes of the baker's yeast *Saccharomyces cerevisiae*, an organism that scientists use to model more complex life systems. The researchers used separate manual experiments to confirm that Adam's hypotheses were both novel and correct.

Adam hypothesized that certain genes in baker's yeast activate specific enzymes, which catalyze biochemical reactions in yeast. The robot then devised experiments to test these predictions, ran the experiments using laboratory robotics, interpreted the results, and repeated the cycle. "Ultimately we hope to have teams of human and robot scientists working together in laboratories," said Ross King, who led the research project.

Source: <http://blog.wired.com/wiredscience/2009/04/robotscientist.html>

U.S. Slips Slightly in IT Rankings

The United States slipped in its global ranking relative to its ability to leverage information and communication technology advances for increased competitiveness and development, according *The Global Information Technology Report 2008-2009*, released by the World Economic Forum. The United States topped the rankings in the annual survey in 2006 before slipping down. It climbed one place to 3 in this year's report.

Denmark topped the rankings this year, followed by Sweden. Although the report praised the U.S. ranking considering the current economic slowdown, it also cited America's low rate of mobile phone usage, a lack of government leadership in information technology and the low quality of math and science education as reasons why the nation did not take the top spot this year. Singapore and Switzerland ranked 4 and 5, respectively. Finland, Iceland, and Norway followed, with Netherlands and Canada completing the top 10. China jumped 11 spots to 46, leading the group of big emerging economies. India was 54 and Russia ranked 74.

Sources: www.usatoday.com/money/topstories/2009-03-28-1033691236_x.htm
www.insead.edu/v1/qitr/wef/main/fullreport/index.html

By the Numbers

The Internet usage rate and connection speed in the United States lag behind several other developed nations.

- The United States has an Internet connectivity rate of 73 users per 100 people and ranks 11 worldwide.
- The U.S. ranks well behind Canada, whose connectivity rate of 85 users per 100 people places it at no.5.

- Among major countries, the Netherlands has the highest Internet connectivity rate, with 92 users per 100 people.
- Mexico ranks 83, with 22 of every 100 people connected to the Internet.
- Japan has 74 users per 100 people — 1st in Asia and 10th worldwide.
- South Korea has 72 Internet users per 100 people, giving it the second highest connectivity rate in Asia and 13 worldwide.
- China ranks 98, with 16 users per 100 people; India places at 93 (18 per 100). Both of these emerging giants rank below the global average of 23 users per 100 people.
- The quality of U.S. Internet connections also lags behind that of other major countries. The average speed in the United States is roughly one-tenth as fast as in Japan.
- High-speed access in the United States is expensive. The average monthly broadband subscription price is \$53, compared to \$34 in Japan and \$32 in Germany.

Source: http://seattletimes.nwsourc.com/html/nationworld/2008748455_globalist16.html