games:
IMPROVING EDUCATION

esa
entertainment
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association

Educators increasingly recognize the impact of entertainment software and utilize games as a teaching device in a growing number of classrooms and business settings. In doing so, they are embracing the cultural and technological shifts of the 21st century and expanding the use of a favorite leisure activity, computer and video games, into a critical and still-emerging educational resource. More than just play, entertainment software helps impart knowledge, develop life skills and reinforce positive habits in students of all ages.

COGNITIVE RESEARCH

In addition to being a great way to keep students engaged, researchers have found that video games have real potential as next-generation learning tools. Games use new technologies to incorporate principles crucial to human cognitive learning. As Dr. Jeffrey Taekman, the director of Duke University's Human Simulation and Patient Safety Center noted, "serious games and virtual environments are the future of education."

University of Wisconsin education professor Dr. James Paul Gee concluded that video games intermix instruction and demonstration, a more effective learning technique than the style currently found in most classrooms. According to a recent study conducted by researchers at the University of Michigan, video puzzle games that exercise children's working memories can enhance their abstract reasoning and problem-solving skills, which can have a direct impact on future educational and occupational success. In addition, a study conducted by scientists at the University of Rochester found that video games can improve players' vision, attention and certain cognitive skills. Study participants also performed better than non-gamers on certain tests of speed, accuracy and multitasking.

In June 2009, the Joan Ganz Cooney Center at Sesame Workshop released a report titled "Game Changer: Investing in Digital Play to Advance Children's Learning and Health" which concluded that computer and video games provide "an important, untapped opportunity" to support learning, particularly when children and adults play together. That same year, the center launched its Innovation in Children's Digital Media prize program, providing incentives for university media labs as well as the entertainment software industry to develop research-based games that promote learning through digital media.

In an effort to maintain this unprecedented momentum, the Department of Education announced in January 2010 that it would provide initial funding for the nonprofit National Center for Research in Advanced Information and Digital Technologies. The center will offer grants to academic institutions, nonprofit organizations or corporations who propose to research and develop new educational technologies, including simulations, computer and video games, virtual worlds and avatars that serve as tutors.

IN THE CLASSROOM

Almost out of necessity, teachers are taking steps today to incorporate computer and video games into learning. From national organizations to individual classrooms, the education community is actively pursuing new methods for developing young minds.

The National Education Association (NEA) serves as a guiding force for instructors, cataloging information that prepares teachers for incorporating video games into the classroom. Electronic Arts' *SimCity* is among the NEA's recommendations. The building game, shown to improve students' problem-solving and analytical skills, plays an important role in many "gaming schools." Aspiring engineering students, for example, participate in the annual National Engineers Week's "Future City Competition," in which middle school students around the country compete to design the best 2150 *SimCity* metropolis.

With the support of the National Science Foundation, researchers at Massachusetts Institute of Technology developed a new science game on behalf of the Smithsonian Institution. Designed for middle school students, *Vanished* requires players to discover what caused a future, hypothetical catastrophe that destroyed all of civilization's historical records by researching and recording a variety of current scientific data. Students can also video chat with practicing scientists, or visit their local Smithsonian-affiliated museum for additional clues.

Middle school and ninth-grade teachers use the online, game-based learning platform iCivics to help teach civics lessons. Former Supreme Court Justice Sandra Day O'Connor collaborated with Georgetown University Law School and Arizona State University to develop the platform. First launched in 2009, iCivics now features five games about constitutional law and the branches of U.S. government, each of which also comes with suggested lesson plans tailored to meet state-specific learning standards. iCivics is currently working to develop its newest offering; an international relations-focused, multiplayer game that will be available on the iCivics website and Facebook.

Additionally, Robert Travis, associate professor of classics at the University of Connecticut and director of the online Video Games and Human Values Initiative, created a game to teach students basic Latin. *Operation LAPIS* is an electronic role-playing game that immerses teams of students in situations requiring them to read Latin and respond to their surroundings in accordance with the worldview of their characters. Teams must type directions in both English and Latin for their character to interact with the virtual world.

The Center for Technology in Teaching and Learning at Rice University worked with the American Academy of Forensic Sciences, the Fort Worth Museum of Science and History, and CBS Broadcasting, Inc. to develop a series of online games called *CSI: Web Adventures* to introduce forensic science to middle school students. The games challenge players to examine a crime scene, requiring them to identify shoe

46 million
The number of children between 5 and 17 years old who are currently gamers, according to The NPD Group.

8.07
Increase in students' math test score numbers after playing *DimensionM* over an 18-week period, compared to an increase of 3.74 points for the control group, according to a study conducted by the University of Central Florida.

and fingerprints, test DNA samples, and interview potential suspects. The project received funding from the National Science Foundation, and is based on CBS' popular "CSI: Crime Scene Investigation" TV series.

The White House has encouraged these trends through its unveiling of the *Educate to Innovate* campaign in November 2009. The campaign seeks to improve Science, Technology, Engineering, and Math (STEM) education for children by enlisting various private companies and nonprofit groups, including the ESA, to spend money, time and volunteer effort to encourage students, particularly those in middle and high school, to pursue these subject areas. The ESA worked in cooperation with several organizations to harness the excitement surrounding computer and video games through the National STEM Video Game Challenge, a game design competition. U.S. Chief Technology Officer Aneesh Chopra announced the competition winners in March 2011.

100 to 135
Number of Global Fortune 500 companies that will have adopted gaming for learning purposes by 2012, according to The Apply Group.

In March 2010, the U.S. Department of Agriculture (USDA) launched its "Apps for Healthy Kids" competition as part of First Lady Michelle Obama's Let's Move! campaign to end childhood obesity. The competition called on software developers, game designers and students to create innovative, engaging applications and games based on USDA's health and wellness data sets that encourage children to eat healthier foods and be more physically active. The ESA's president and CEO, Michael D. Gallagher, served on the competition's judging panel, alongside experts from the fields of technology, nutrition and education. The USDA announced a group of 12 winners in September 2010, including grand prize winner *Trainer*, a computer game that challenges players to maintain the health of a virtual creature through proper nutrition and fitness training, and requires them to exercise along with their creature by using a webcam.

In some instances, games provide a framework for a school's overall curriculum. New York City public school Quest to Learn uses a teaching model that draws direct inspiration from video games to create highly-immersive and challenging learning experiences. Games also play a direct role in many classrooms, with teachers requiring students to design their own video games, or play them as part of their coursework. Quest to Learn will open a new Chicago campus in fall 2011.

10 million
Number of people that have played *Food Force* since the game's release in 2005, according to the United Nations World Food Programme.

An increasing number of teachers and school administrators also recognize the educational value of video game design courses, which provide their students with instruction in traditional academic subjects as well as career preparation. Now, state education officials are beginning to standardize and approve game design curriculum for statewide use. The Texas State Board of Education approved standards for a new high school Game Programming and Design course, and the North Carolina State Board of Education approved introductory and advanced Game Art and Design courses for high school students in spring of 2011. Both sets of standards will go into effect for the 2012-13 school year.

SUMMER CAMPS

Kids also have the opportunity to learn how their favorite games are made over summer vacation, as the number of technology-driven summer camps offering programs in video game design and programming continues to grow. iD Camps, a California company that runs programs at more than 60 college campuses nationwide, has an overall enrollment of 20,000 campers.

iD's Ohio State University-based camp engages children age 7 to 17 with basic and advanced courses in computers, robotics and design. The subject matter varies from session to session, incorporating such topics as instruction on Smartphone game design, 3-D

programming and graphics development, and campers learn important skills from industry experts using cutting-edge technology while building camaraderie with peers.

PROFESSIONAL SKILLS AND PUBLIC EDUCATION

The results that computer and video games have produced for teachers and students in the classroom have encouraged educational and training efforts outside the classroom. Businesses use games to train employees and games are becoming a key fixture in public education campaigns.

One entertainment software company, Games2Train, has developed employee training games for American Express, Bank of America, IBM, JP Morgan Chase, Nokia and Pfizer. In addition, Canon uses a video game in which repairmen must drag and drop parts into the right spot on a copier to train technicians. IBM has also produced *Innov8*, a free, interactive game that teaches graduate students business and technology skills. In addition, the Los Alamos National Laboratory created a 3-D virtual training program for nuclear facility inspectors, which helps inspectors learn how to identify safety hazards at a plant.

Video games and their technologies also serve as a tool to reach and educate the public. Developers also incorporate political issues into games to engage the public in the key policy debates taking place on Capitol Hill and around the country. In July 2011, American Public Media, in cooperation with the Woodrow Wilson International Center for Scholars, released *Budget Hero 2.0*. The game brings our country's budget debate to computer screens, and challenges players to make difficult decisions about how best to balance the nation's complex budget.

DEGREE PROGRAMS

The educational benefits of video games are extending into higher education. Ludology, scholastic video game study from a humanistic perspective, now qualifies students to pursue careers in computer and video game design and programming.

343 American colleges, universities and technical schools, including New York University, the Art Institute of Seattle and Marist College, will offer programs and courses in video game design, development and programming during the 2011-12 academic year, including 301 undergraduate programs and 42 graduate programs. This list includes the Game Design and Development program at Rochester Institute of Technology, the Game Development program at DePaul University and the Serious Game Design program at Michigan State University. These same institutions also offer similar undergraduate programs.

The positive impact of this trend is tangible. The DigiPen Institute of Technology in Redmond, Wash., which grants undergraduate and graduate degrees in video game development, helped transform the Seattle area into one of the nation's leading game development regions. With a research lab at the prestigious Parsons The New School for Design in New York developing video games for training public officials, students and professionals, the impact is only just beginning.

It is clear students, educators and lawmakers understand that video games can provide a lucrative career path for young graduates with starting salaries significantly higher than other industries. In fact, the video game industry's average compensation per employee is $90,000.

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