

The Games People Play

A New Medium Emerges



Computer games don't affect kids. I mean if Pac Man affected us as kids, we'd all be running around in darkened rooms, munching pills and listening to repetitive music.

– Marcus Brigstocke, British satirist and comedian

by Anna Lynn Spitzer

Not quite true, Marcus. Research in game play theory and practice indicates that computer games do affect children – and adults, as well – helping them to learn, socialize, surmount cultural differences, conduct business and, believe it or not, make the world a better place.

This is not news to researchers and professors at Calit2 and UC Irvine, where studies of computer games and their vast potential have been underway for several years. In fact, UCI's Game Culture and Technology Lab, established in 2000 in the Claire Trevor School of the Arts and affiliated with Calit2 since 2002, was the first in the University of California system. With nearly 20 affiliated researchers spanning fields from anthropology to education, and from studio art to history, it has become

a UC hub for computer game research.

Since their debut nearly 60 years ago, video games and their progeny – computer, console and web versions, and online virtual worlds – have made contributions to society in surprising ways.

Social Value

While millions of consumers spend billions of hours just playing – Microsoft Xbox Live has more than 6 million members worldwide – millions more are turning to games for more than entertainment.

Take the U.S. military. As many as 100 video games currently are used in military training programs, and in 2006, the Department of Defense reportedly allocated \$120 million for the

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timeline

1948

Computer game forerunner *Cathode-Ray Tube Amusement Device* receives U.S. patent.

1958

Tennis for Two – First video game introduced to the public. Creator William Higginbotham previously worked on Manhattan Project at Los Alamos National Lab.



1962

Group of MIT students program *Spacewar*, the first widely available video game. It is eventually distributed with new DEC computers.



1966

Chase, first game to display on a standard television set, is created.

development of new versions. Computer simulations and immersive virtual reality games effectively create combat or terrorist scenarios for soldiers to hone their skills in a near real-life setting.

Computer games also have the capability to manipulate time and

games perfect teachers. They “possess infinite patience, and increasingly can be modified to match the learner’s interest,” says Kimberly Burge, senior lecturer in UCI’s Department of Education.

Burge is an ardent advocate of using computer games in teaching; she requires her master’s degree students to build their own. “That way, they will be much more likely to integrate the technology in their own classrooms,” she says.

Her students utilize a game platform called “Imagination,” which lets the teachers-to-be design games that address relevant issues and include problem-solving scenarios. They can easily incorporate pertinent news stories, pictures, maps or characters. The first group of students developed a game around saving the Hetch Hetchy Valley in Yosemite National Park.

“This is a prototype that future teachers might employ ... to achieve their own learning goals,” says Burge.

ICS researcher Hadar Ziv’s software engineering students in a UCI informatics class helped design the game platform. “People learn through communication, collaboration



EcoRaft is a hands-on, engaging way for kids to learn about restoration ecology. EcoRaft is one of several projects under development in the Calit2 Interactive Animation Lab.

space in a way that is not possible in reality, a characteristic that intrigues Calit2 researcher Bill Tomlinson. The assistant professor of informatics studies human-computer interaction and computer-assisted learning. He teamed up with Lynn Carpenter, professor of ecology and evolutionary biology, to design EcoRaft, a computer game for teaching restoration ecology to children.

“In the real world, it would be impractical and immoral to wipe out a species to see how the rest of the species react, but you can do that in a virtual world,” says Tomlinson.

Ideal Instructors

For children, the interesting sounds and colorful graphics make computer



The Imagination platform, developed by UCI students, lets teachers design their own computer games.

1970	1972	1972	1975	1976	1978	1980	
Budding industry splits into new areas: arcade machines, university computers, handhelds, home computers.	Atari founded by Nolan Bushnell and Ted Dabney. Company releases Pong.		OXO, first handheld electronic game, released.	Atari releases home version of Pong – spurs home video game industry.	First controversy: Death Race released in arcades. Players try to hit pedestrians with cars.	Space Invaders and Asteroids released. 	Pac-Man is first game to achieve widespread popularity in mainstream culture.

and interaction,” Ziv notes. “Games can be played across users, across nations, across boundaries; this seems to have a very profound effect on the learning experience.”

Adds Tomlinson: “Games can be very engaging. When designers understand the elements that contribute to their appeal, they can make games that connect people with many different bodies of content.”

“One wonderful possibility for games is the ways in which they can be used to change the world.”

The John D. and Catherine T. MacArthur Foundation announced plans last year to commit \$50 million over five years to building the emerging field of digital media and learning. The foundation will fund research and innovative projects focused on understanding the impact of the widespread use of digital media on youth and how they learn.

From the Mouths of Babes

UCI Professor Patricia Seed first realized the potential of computer games when she saw her then 8-year-old son engrossed in a game set in the Middle Ages.

“His vocabulary included words like ‘arquebus’ and ‘paladin.’ Watching him and seeing how much he was learning, I thought, ‘this is clearly working. He’s learning and I’m not forcing it down. He thinks it is great fun to learn all these interesting things.’”

She began incorporating the computer games “Civilization” and “Age of Empires” to teach her undergraduate history classes. “They really fit into the syllabus because

Concentrating on Games

Numerous multi-million dollar computer game companies know firsthand: games are serious business.

Orange County is home to several of those companies, including Blizzard, Shiny, Red 5, Quicksilver and GameSpy.

Research into what makes the computer game industry tick is serious business, too.

To help prepare interested students for jobs in research and industry, UCI recently established a Game Culture and Technology undergraduate concentration within the Claire Trevor School of the Arts and the Donald Bren School of Information and Computer Sciences.


The program, which began last fall and accepted 12 students into its inaugural class, offers the concentration to students majoring in arts or computer science. It encompasses classes in gaming studies, computer game development, interactive digital media, interdisciplinary digital arts, software engineering, artificial intelligence and computer graphics, among others.

students get a broad sweep of history,” she says. “And you don’t have to worry about student engagement or the desire to learn about the past.”

Seed currently teaches World History through Games, a class in which students choose a historical period, research it and design their own game. Everyone – even the non-history majors who comprise the majority of



The program, first proposed in 2000 and approved by the university in 2005, was the first interdisciplinary academic program of its kind to be recommended at a top-tier North American research university, says founding director Robert Nideffer.

“For the study of games and gaming to reach its full potential, we must cultivate a deeper appreciation not only of their economy, but of the ideas that drive them, the experiences they offer, and their cultural and social implications,” he says. “Games share features with other forms of media and culture, yet have many distinctive characteristics as well. We must develop a more refined and critical vocabulary for articulating those characteristics, and that’s precisely what the concentration aims to do.” 

the class – is engaged and motivated, she says. “I have had very few slackers or people who don’t take interest.”

Socializing through Gaming

Critics have labeled computer games isolating and anti-social. To the contrary, some researchers credit the genre with improving socialization skills by rewarding

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	<p>1981 Donkey Kong introduced. Game has four levels – three more than most games.</p>		<p>1984 Sierra King's Quest, first modern adventure game, released.</p>		<p>1985 First IBM-compatible computer becomes technically competitive game platform with release of IBM's PC/AT.</p>		<p>1985 Atari ST and Commodore Amiga debut.</p>		<p>1985 Tetris developed by computer scientist Alexey Pajitnov.</p>
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collaboration and connecting people from different cultures.

UCI Professor Bonnie Nardi is interested in theory in human-computer interaction and computer-supported collaborative work. She studies World of Warcraft (WoW), a massively multiplayer online game (MMOG) with more than 8.5 million subscribers.

“What you played yesterday is different from what you will play tomorrow.”

Players create online personas that move through the role-playing game.

like WoW prepare players to form relationships, bond and collaborate with people they don't know. “These are people we may never see, but we form common ground quickly. It's actually the opposite of what traditional culture does, which is cut us off from people who are different from us.”

WoW, which was launched by Irvine-based Blizzard Entertainment in November 2004, incorporates live chat into its format, allowing even more interaction than other sites. “When you're online and listening to voice chat, you hear different accents. I believe that has the potential to carry over into real life and break down cultural barriers,” Nardi says.

Some critics also condemn the violence inherent in a number of games. But UCI's Peter Krapp, who studies media history and theory, disagrees that violent computer games desensitize players.

“I see no academically respectable way to maintain that they do,” he says. “Humans have had violent games for thousands of years. If players are able to fully digest and comprehend the role of force, violence and brutality in these

games, then there is no worry about it translating into violence in society.”

Many games are even socially redeeming, addressing society's ills. Presenters at Living Game Worlds III, a recent conference in Atlanta,



UCI students learn a variety of skills by building games on Second Life's Anteater Island.

They explore, develop skills, make money and socialize, advancing through 70 levels by mastering certain tasks called quests. The game is complex, and players learn from and support each other.

Nardi says that social spaces

1989

Sim City creator Will Wright self-publishes game when he can't find a company to produce it.



1989

Game Boy debuts.



1990s

Rise of 3D graphics, multimedia capabilities and Internet games.

1992

Real-time strategy game *Dune* released. Sets the standard for RTS games like *World of Warcraft*.



1993

Myst published. One of the first computer games to use high-capacity CD-ROM storage format.



shared their development work on specific games built around difficult topics like Darfur and Columbine. Tomlinson presented the EcoRaft project at the conference.

“One wonderful possibility for games is the ways in which they can be used to change the world,” says Tomlinson. “They can help bring communities together, and help people learn about new concepts and engage with new topics in new fields.”

A New Reality

Virtual worlds, a first cousin to computer games, offer other surprising opportunities.

“... games are in the same spot films were in 100 years ago.”

The most popular virtual world on the Internet is Second Life with 5.6 million residents. It differentiates itself from competitors by facilitating the transfer of currency into and out of the game. Players purchase Linden dollars with U.S. or foreign currency to buy and sell property and consumer goods, and purchase services from other citizens.

In March 2007, more than 31,000 residents experienced a positive monthly cash flow. And some players have traded in the day-to-day drudgery of real-world jobs, making a living by designing, buying and selling virtual goods in Second Life.

A welcome message on Second Life’s site states: “We are a global community working together to build a new online space for creativity, collaboration, commerce and entertainment. We strive to bridge cultures and welcome diversity. We

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Showcasing UC Game Research



Dino Quest Online was a hit at this year’s Game Developers Conference.

UCI game researchers shared their work-in-progress with industry leaders at the 20th annual Game Developers Conference held in San Francisco in March.


After receiving an invitation from the UC Office of the President, the group joined colleagues from other UC campuses, including UCSD, UC Santa Cruz and UC Riverside at the week-long gaming conference.

GDC features more than 300 lectures, panels, tutorials and round-table discussions on a comprehensive selection of game-development topics. The conference’s Web page says it continues “to define market innovations and future vision, providing insight into the future of gaming.”



UCI representatives demonstrated Dino Quest Online to the conference’s 12,000-plus attendees, and UCI representative Walt Scacchi said the game attracted a lot of attention. “Several corporate executives were very interested in the whole physical environment/online game concept. We started discussions with at least one group that is interested in licensing the content.”

Scacchi said that while several other educational institutions were represented at the conference, the UC contingent was the only one focused on research. And UCI’s group in particular stood out. “We have more faculty involved in game research than any other campus or school in the U.S.” he said.

Scacchi and Game Lab co-director Robert Nideffer presented the group’s research and accomplishments again to the UC Board of Regents May 10 meeting in Oakland. Scacchi said the University of California is particularly interested in gaming as an up-and-coming research area, and board members were impressed by the depth of UCI’s work. 

1993

U.S. Senate launches an investigation into video game violence.

1994

Entertainment Software Rating Board established.

1994-95

PlayStation and Sega Saturn – the first console with a built-in modem – released.



1996

Nintendo 64 hits the market, selling more than 1.5 million units in three months.



1998

Nintendo releases Pocket Pikachu, a virtual pet with a built-in pedometer.



Developing a Global Network

Researchers at Calit2's Computer Game Culture and Technology Laboratory are embarking on a new partnership with Korean researchers that will advance information sharing and digital gaming technology.

The three-year, \$1.3 million grant from the Center for Digital Industry Promotion (DIP) in Daegu City, Korea was announced in April. It will allow

Calit2 researchers to work hand-in-hand with their Korean counterparts over a high-speed digital network.

A new unit, the Daegu Global R&D Collaboration Center, will be created in Daegu City to serve as a hub for the

trans-Pacific research project.

The project will begin with participants improving the long-distance communications link that will allow them – and eventually many other researchers, developers, educators and students – to interact effectively. With a high-speed broadband communication infrastructure established, participants in

both countries can communicate via high-definition Internet videoconferencing and related information-sharing environments.

Then they will collaborate on heterogeneous game networks, new game devices, and tools and techniques for developing beyond-next-generation games.

Investigators will examine assorted game networks – on mobile devices and personal computers, for example – that will facilitate playing the same game with similar graphics on different devices. They also plan to investigate new methods that facilitate massively scalable approaches to both game development and game play.

The joint venture is managed by UCI Game Lab Director Robert Nideffer and Associate Director for Research Walt Scacchi. Scacchi and Nideffer have been developing stronger ties to DIP and the Korean game industry for more than two years.

"We are looking forward to growing our productive relationship with our Korean friends and colleagues," Scacchi said. "Our goal in this project is to develop improved concepts, techniques and tools that will support highly effective information sharing and collaborative work practices." 

who buy an item in the virtual world a discount on real-world purchases.

In addition, blue-chip companies like IBM, Intel and Hewlett-Packard are experimenting to determine how virtual worlds can help them interact with distant customers and employees.

They are conducting meetings in the virtual space, as well as using it for training, private collaboration and outreach. News bureau Reuters has an office in Second Life where its journalists interact with each other, and the Swedish embassy has an office there where actual business transactions occur.

Bonnie Nardi sees this as just the beginning. "Absolutely, without question, in the future I think more businesses will participate this way," she states.

The UCI Library recently purchased a Second Life island, and Tomlinson, along with colleagues Peter Krapp and Dan Frost, are using it to teach an undergraduate course called Computer Games as Art, Culture and Technology. Students are required to build a game on Anteater Island as a way to understand different elements of technology and how people interact with it.

"They learn about programming, geometric modeling, animation and game design. In addition, it lets them explore the social aspects of the creation of interactive experiences in a massively multi-player virtual world," says Tomlinson.

A New Medium Emerges

Love 'em or hate 'em, video/computer games have made their mark on society. In fact, Walt Scacchi, co-director of the Calit2 Game Lab, compares the genre to radio, television, cinema, print media and the Internet in its cultural pervasiveness.

believe in free expression, compassion and tolerance as the foundation for community in this new world."

Entertainment, media, apparel and automotive brands, including

General Motors, Reebok, Toyota and Adidas, have bought in. They make their products available to purchasers with Linden dollars and some utilize cross-promotional tactics, giving players

2000

Sony releases Play Station 2, the first console with better graphics than a PC and the first to use DVD technology.

2000

The Sims debuts. Becomes the best-selling computer game of all time.



2001

GameCube, the first to allow wireless phone connection for Internet access, is released by Nintendo. Microsoft releases Xbox.



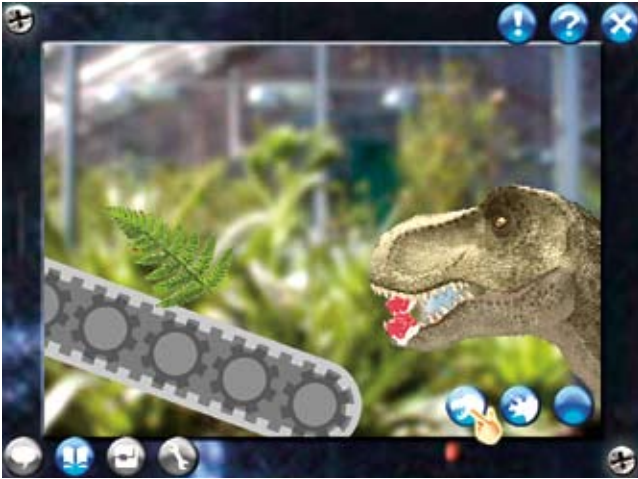
2002

G4, the first TV network devoted to only online and wireless games, debuts.



2002

U.S. Army makes an effort to attract recruits with release of *America's Army*, which is distributed free of charge and becomes the No. 1 online action game in the country.



Dino Quest Online, created by Calit2 researchers, teaches children about dinosaurs' digestive systems, food-chain relationships, physiology and more.


"These games represent the first new medium of the 21st century," he says. "They can be seen as a cultural medium, a technology, a system of commerce, a literary form – they have the potential to be all these things."

Tomlinson concurs. "I think games are in the same spot films were in 100

years ago," he says. "Just as films have become the medium for more interesting human expression, games have the potential to flower into something much more interesting."

Gaming's popularity is influenced by its fluidity. "Part of what people like is the interaction, the immersion, the play. What you played yesterday

is different from what you will play tomorrow," Scacchi says.

Games are still evolving, he adds, but one thing – a fact that game researchers and developers know firsthand – will never change. "The key to a successful game is fun, and fun is really hard work." 

Gaming by the Numbers

- The current size of the game industry – including hardware, consoles, software, networking, telecommunication and online services – is estimated to be \$11.5 billion annually.
- The figure is forecast to grow to \$30 billion annually within the next five years.
- Research shows the average player is 33 years old and has been playing games for 12 years.
- Forty-four percent of gamers are age 18 to 49.
- Thirty-eight percent of all game players are women.
- Twenty-five percent of gamers are 50 years old or older.

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2003

Virtual online environment *Second Life* is created.



2006

PlayStation sells 103 million consoles in the first three months of the year.



2006

PlayStation 3 is released on Nov. 17 and Wii is launched Nov. 19. Wii outsells its competition by a 2:1 margin before the end of the year.



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A New
Game Plan