<u>NOT ALL GAMERS ARE LIKE DR. RANDY WOLF</u>

November 21, 2005   John M. Tew, Jr. M.D.

During the course of my 20-year membership in the Literary Club, I have written papers that dealt principally with my exposure to pursuits that commanded my intellectual and physical involvement. As a result, you have shared my explorations of some unusual topics, ranging from China's emerging revival, to monastic life, to competitive cycling.

Tonight's story is somewhat different. It began about a year ago with a casual conversation with my 5-year-old grandson, Nicholas, who asked me if I liked to play video games. I replied that I had little experience with such games but would like to learn more. I did hasten to remark that I had a great deal of experience with computers and the applications of computer programs for the diagnosis of neurological disorders and the performance of operations.

Nicholas became excited and asked if we could play a new game, called *Operation,* which was on a CD that his mother had obtained as a reward for purchasing a cereal package from General Mills. I soon learned that *Operation* was a computer video version of a mechanical game of the same name licensed by Hasbro and to which I had introduced Nicholas when he was 3. Nicholas, clearly at ease with this newer, electronic creation, activated the computer program and quickly performed a flawless appendectomy. The rapid, precise movement of the cursor and the absence of hesitancy in the control of the mouse signaled a role reversal in our relationship. My concern was quickly confirmed as I was repeatedly outscored by the dexterous and gleeful 5-year-old game expert.

I suggested to Nicholas that direct experience with video games could surely help prepare one to become an outstanding surgeon. Nicholas, his interest piqued and clearly unimpressed with my practical skills, pressed for an example. Without hesitation I told him about Dr. Randy Wolf.

 Randy Wolf first came to my attention in the early 1990's, when he joined the staff at The Christ Hospital as a cardiac surgeon interested in new technology. In particular Dr. Wolf was investigating the application of endoscopy to surgical procedures of the chest.

Endoscopy, or endoscopic surgery, involves the separation of the surgeon's hands and

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eyes from the operative field. The technique requires the interposition of a virtual monitor, or screen, on which one views the anatomy and surgical instruments. The surgeon's hands operate the instruments, while he views the action on a video screen. The two-dimensional field of view is created by a telescopic camera placed inside the body and focused on the instruments and the anatomy.

Soon Dr. Wolf became one of the international pioneers in this rapidly evolving field as a result of his remarkable skills, some of which he attributed to the practice he had gained in his hobby as a magician. Subsequently, I learned that "gamers" of Randy's era had learned their skills of legerdemain and strategy from board and card games. Randy developed his passion for magic as a teenager. He learned tricks in the attic of his grandparents' home in Indiana and years later taught his three children to be expert magicians.

Today, you know Dr. Randy Wolf as the Ethicon Endosurgery Professor of Surgery and Biomedical Engineering at the University of Cincinnati and the Director of the Center for Surgical Innovation at the UC College of Medicine. Randy is an international pioneer in the application of robotics to cardiac surgery. He developed the robotic procedure for the cure of atrial fibrillation, a the leading cause of stroke and heart failure.

The history of gaming is buried in antiquity. The game of chess began as a military strategy, a method of plotting battles and evaluating lines of attack. As such, chess was the first historical simulation or war game.

The father of modern board gaming was Charles Roberts, who in 1950 developed the first commercial war game, called *Tactics*. By 1962 more than 200,000 units of *Tactics* were sold annually. The complexity of these board games varied from the simple, requiring 30 minutes to complete, to the expansive, with editions like *Campaign for North Africa* commanding gamers' attention for more than 1,200 hours. Players of these games focused on experiencing history rather than competing against each other. Hasbro was the leading game manufacturer in the United States, and board games remained king of the industry until the 1970s, when they were swept away by electronic video games.

Nevertheless, computer games did not enjoy an auspicious birth. A.S. Douglas, a doctoral student at Cambridge University in the UK, created the first video game, called

Naughts and Crosses as a requirement for his thesis. This tic-tac-toe game ran on a giant computer, called the Electronic Delay Storage Automatic Calculator. Douglas's dissertation attracted little attention from the doctoral committee, but the young scholars were fascinated by the game.[i]

In 1958, while working in the nuclear research laboratory at Brookhaven in Upton, N.Y., William A. Higgenbotham, a fun-loving engineer who had worked on the atomic bomb, became the first American to invent an interactive computer game. In creating *Tennis for Two*, Higginbotham used a small analogue laboratory computer to display the trajectory of a moving ball on an oscilloscope with which the players could interact. In this rudimentary side-view tennis game, the ball bounced off a long horizontal line at the bottom of the screen, and a small vertical line in the center represented the net. The game, used to entertain visitors at the annual open house of the National Laboratory, was simple, fun, and infectious.

At MIT a few years later, a group of hard-core computer nerds known as the "Tech Model Railroad Club," developed what became the first truly interactive video game. Led by 25-year-old programmer Steven Russell, they conceived the idea of pitting two spaceships, dubbed "Wedge" and "Needle," with limited fuel supplies against each other in a missile duel. *Space War,* using an adrenaline-pumping scoring system that limited players' time at the switches, created a sensation at MIT's annual science fair. A huge hit with the computer community, the game quickly spread to other universities in the United States across the then-burgeoning Internet precursor, the ARPA Net.

Like Higgenbothem, Russell didn't bother to copyright or patent his work, because *Space War* ran on a PDP1, a $120,000 computer the size of a refrigerator, and was part of the public property at MIT. The program became the most copied concept in video game history.

In 1966 Ralph Baer, one of the early creators of television, built a multi-game unit that could be played on a TV monitor and became the first person to file for a video game patent. The first commercial units, sold by Magnavox as *The Odyssey*, were capable of switching between various games: basketball, volleyball, hockey, ping pong, and a shooting game called *Light Gun*. Baer, known as the father of video games, lived to see television and video games capture the entertainment and educational focus of our culture.

If Baer was the father, then Nolan Bushnell became the Zeus of the video game industry.

At age 18, Bushnell was convinced that gaming was commercially viable if its circuitry could be scaled down to a compact size. He created a simplified arcade version of *Space War*, using primitive chip technology, and founded a company called Atari. Atari's breakthrough came when Bushnell and his colleagues created a home version of ping pong called *Pong*, which could be played on any TV set. Bushnell went on to establish a marketing arrangement with Sears, and in 1975, Pong -- selling for $100 – became Sears' best-selling item

In 1980 the Japanese company Nameo brought *Puchman* to the United States. Concerned that the first animated character might be vulgarized, the company changed *Puchman* to *Pacman.* Such was the perceived value of the new games that no less than President Reagan remarked that, "Many young people have developed incredible hand, eye, and brain coordination in playing these games. The Air Force believes that kids will be our outstanding pilots of our jets in the future."[ii] The year was 1983.

A few years later, *Mortal Kombat*, a game containing digitized images of real actors recreating bloody fatalities and ripping opponents' hearts out of their chests, provoked great controversy and led to Senate hearings by Lieberman and Kohl. In 1993 concerns regarding provocation of violence led to legislation creating the Entertainment Software Rating Board that assessed content in accordance with six rating symbols and 31 descriptors. Parents complained about the confusing rating system that contained categories only for early childhood, teens, mature audiences, and adults only. Professor Henry Jenkins, Chair of the Department of Comparative Studies at MIT, testified that there was no evidence that violent video games influenced aggressive youth behavior.

 Further refinement of video game technology occurred rapidly. Improved graphics, 3D and DVD technology, and megabit capacity allowed the creation of raw realism. In 2001 *Grand Theft Auto 3* crashed on the game scene with untamed lawlessness, murder, prostitution, and theft. The state of Washington became the first to sign legislation prohibiting video game venders from selling or renting cop-killing games to minors. The regulation was subsequently declared unconstitutional.[iii]

In 2002 the U.S. District Court in St. Louis ruled that video games do not convey ideas and thus enjoy no constitutional protection under the First Amendment. The ruling was overturned in the Federal Court of Appeals by Judge Richard Posner, who wrote, "Violence has

always been and remains a central interest of humankind, an obsessive theme of culture, be it high or low. Violence engages the interest of children from early age, as classic fairy tales collected by Grimm, Anderson, and Perrault demonstrate." Posner ruled, "To shield children right up to the age of 18 from exposure to violent images would be not only quixotic, but deforming; it would leave them unequipped to cope with the world as we know it."[iv]

Recognizing the appeal of video action and seeking to attract recruits, the U.S. Army produced *America's Army,* a sophisticated and absorbing enterprise in which players from all over the world form anonymously into teams of 12 and square off against other teams. Take down opponents or accomplish the mission, and your honor level rises; kill two of your teammates, however, and you're booted off the server. *America's Army*, which cost $6 million to produce, was distributed free of charge and quickly became the No. 1 online action game in the United States.

Today, half of all Americans play video games. Ninety-two percent of American children age 2 to 7 have regular access to games, although only 80 percent live in households with computers. It is said that video games have sped the process to widespread computer literacy, a figure supported by statistics that the average video gamer is 30 years of age. According to the Entertainment Software Association (ESA), the gaming industry has eclipsed music and the film markets for revenue.

Video games are a permanent and rapidly expanding segment of mainstream culture. Technology publications report that adults spend seven to 18 hours a week gaming and that the typical gamer has been playing for more than 12 years. Most players report that game play comes largely at the expense of television viewing time. Meanwhile, the market for video games continues to broaden. U.S. sales exceeded $6 billion in 2004, a 23 percent increase in one year. The attraction is global. In Asia, online tournaments attract thousands of spectators, and professional players are the new rock stars.

The *Grand Theft Auto* franchise produced by the company Rockstar, whose work, you will recall, led to Senate hearings and the establishment of rating scales, has been wildly popular, with its most recent rendition, lionized for rich style and expansive design, selling more than 50 million copies and generating more than $1 billion in revenue. At the same time, the company has been targeted by those who believe that violent video games are a prime cause of society's

moral and cultural decay.

In the summer of 2004, for instance, Senator Hillary Rodham Clinton called for a federal investigation after Internet hackers uncovered a sexually suggestive scene – "San Andreas" -- hidden in *Grand Theft Auto's* computer code. Rockstar claimed the scene was never intended for public view. Senator Clinton plans to introduce legislation that would make it a federal crime to sell or rent video games rated mature to people under age 18. She blames video games for creating "a silent epidemic of media desensitization" and for stealing "the innocence of our children."

Don Hauser, the 31-year-old creative director of Rockstar Games, is concerned about the political heat but has not been distracted from his vision to improve the art of his creation. He reflects, "All forms of media when they first appear are a function of technology … so with video games we are just working through the historical process."

One can surmise that Rockstar's games have been simultaneously popular and controversial because they are set in an approximation of modern reality, replete with all its generational and political tensions. In contrast, most other video games take place in a vastly different time and place, often in a space-faring future threatened by slavering aliens or in a Tolkien-inspired fantasy world of goblins and orcs. "When we started Rockstar, we wanted to make games that we would not be embarrassed to play," Mr. Hauser said. "As a grown man, I find playing with an elf a little bit demeaning. We're into gangster movies, car chases, westerns, warriors, and lots of other things. Maybe in 20 years we can make a game that is more sophisticated at a character level. Today, we are still at a point in the evolution of games that physical action is more effective to convey than emotions or conversations."[v]

Other video games reject physical violence to portray works of great creativity and imagination. Game researcher Robin Hunicke of Northwestern University creates games that use forms of artificial intelligence to heighten the responsiveness of play. Hunicke sees great potential for increasing the interactivity of games. She predicts that soon game narratives will change depending on what an individual player chooses to do. She says, "By investing games with real consequences, we create artistic statements that help people explore the morality of different choices in ways of behaving." She concludes that in less than 30 years, video games have changed the way we think about computers, theater, television, and film. They redefine how

we consume and produce entertainment.[vi]

It appears evident that, as the current culture evolves, video games will become the lead component of the entertainment and educational industry. Video game technology will focus becoming more personal, digital, mobile and virtual. These are the four important characteristics of the flat world identified by Thomas Friedman in his book, <u>The World Is Flat</u>. 7

Bill Gates, in a recent interview with *Time* magazine, identified the X-Box as the Trojan horse that will deliver access to the family unit for digital music, photography, movies, television, Internet, and telephony. Microsoft has coined a new acronym, DEL, to promote digital entertainment and educational lifestyle. It is a lifestyle we are rapidly embracing as new digital, personal, mobile, and virtual technologies penetrate every dimension of our lives. Roughly 108 million Americans will spend more than $7 billion on games in 2005. Bill Gates and other moguls see the enormous growth potential of this technology as it increasingly defines how we live, learn, and play at home.

Given that gaming technology has become a staple of our culture, we are compelled to learn to master or harness its valuable attributes and identify those aspects that may be harmful to our families and communities. Specifically, I am stimulated to help guide Nicholas in the quest to understand how video games can help him become a successful student, person, and member of his community.

Skepticism of new media is a tradition with deep roots, going back at least as far as Socrates, whose objection to written texts was outlined in Plato's *Phaedrus*. Socrates worried that relying on written text rather than oral tradition would create forgetfulness in the learner's soul. "Because they will not use their memories, they will trust external written characters and not remember of themselves," he said. He objected that a written version of a speech was not a substitute for the ability to interrogate the speaker. 8

There was a time when novels were considered too vulgar and lacking in value for university literature courses. And waltz music and dancing were condemned by some college leaders as late as the mid-20th century, and rock 'n roll was thought to encourage violence, promiscuity, and Satanism.[vii] But today, Bono is an international ambassador who is welcome at the G8 conclave as an authority on eliminating world poverty.

Some say that the opposition to gaming springs largely from the neophobia that for

centuries has pitted the old or accepted against the new entertainments of the young. Most gamers are under 30, and most critics are the age of Senator Hillary Rodham Clinton and others who may share her political motives. Let's examine the evidence that video games foster addiction and encourage violence.

Ours is an image-based culture. The average adolescent or teenager watches television 25 hours a week, plays video games seven to 17 hours a week, uses the computer four to eight hours per week, and uses the cell phone for games, text messaging, and calls for the remainder of his waking hours. This is an exaggeration, of course; but seriously, we are in a flat world where digital, virtual, mobile, and personal technologies are widely embraced -- a world where the iPod, the smart phone, and the computer create a culture of seamless connectivity.

We live in a world where your phone queries are answered in Kuala Lumpur and your accounting, transcription, and x-rays are interpreted in India; a world where your 9- year-old is tutored in calculus online by a 10-year-old in Delhi; a world where Dr. Wolf may soon be operating on a patient in Dublin with the help of his DiVinci Robot located in the Center for Surgical Innovation at UC, while surgeons around the globe view his work and listen to his teaching in their native tongues.

Steven Johnson, author of <u>Everything Bad is Good for You: How Today's Popular Culture is Actually Making Us Smarter</u>, calls video game learning a positive brainwashing, a force for good. Using Woody Allen's analogy of the sleeper curve, Johnson imagines that video games stimulate collateral learning, produce a cognitive workout, and tap the brain's natural reward circuitry. Drawing from fields as diverse as neuroscience, economics, and literary theory, Johnson demonstrates that our culture is not declining but changing in exciting and stimulating ways.9

Others support the enlightenment associated with gaming. In <u>Got Game, How the Gaming Generation is Reshaping Business Forever</u>, John Beck and Mitchell Wade surveyed 2,500 Americans, most of them business professionals.[10] They found that gamers, while less likely to describe themselves as hard-working, were more knowledgeable, better paid, more confident, and emotionally labile. Gamers shared a set of attitudes and behaviors traceable to a childhood immersion in video games. Some of these included a willingness to take risks, a strong interest in exploring unusual approaches to problem-solving, and the flexibility necessary for

multi-tasking and assuming multiple roles in an organization.

In a parallel study, adult gamers were more involved in sports, community activities, religious and creative endeavors, cultural events, and reading than their non-gaming peers. In total, adult gamers spent 24 hours a week in these non-image-based activities.

Today's average video game requires 40 hours to complete. This task alone requires commitment and discipline similar to reading and quite dissimilar to watching television. Johnson claims that the documented increase in the IQ of today's generation is a result of its exposure to video-computer technology. He attributes this finding to fluid intelligence and tests that measure interpretation of visual signs, sounds, and symbols, rather than written words and numbers. In our image-based culture, reading great books, conversing in debate, and competing in board games risk being replaced by the mental gymnastics of video technology capable of stimulating multiple senses.

Paul Gee, Morgridge Professor of Reading at the University of Wisconsin, describes the positive benefit of video games in greater detail: "Better theories of learning, more suited to the modern, high-tech global world, are embedded in video games." He claims that the virtual relationships children develop as a result of "semiotic domains" have important implications for social justice. He argues for a "new model of learning through meaningful activity in virtual worlds as a preparation for social consciousness in our post-industrial, technology-rich real world." 11

He claims that, like *Monopoly, Clue*, and other board games that helped our generation develop strategy, think, plan ahead, be patient, play fairly, take turns, and follow directions, video games accomplish similar learning but go much further, as video games are based on classical conditioning theory. The sights, sounds, colors, tactility, and inner activity are powerful reinforcers. Video games, fast-paced and entertaining, encourage interpersonal interaction with competitive partners, real or imagined.

The activities that promote mastery may be different from the activities that promote discovery. What makes knowledge automatic is what gets you to Carnegie Hall – practice, practice, practice. In our culture, children, rich or poor, grow highly skilled at video games they play for hours. It's the games that encourage variation, strategy, thought, flexibility, and inventiveness that will encourage a balance of repetition of learning designed to stimulate natural

ability.

Adult enthusiasm for video games is part of a broader cultural transformation that Communications Professor Joshua Meyrowitz in his award-winning book, No Sense of Place, describes as the blurring of age, gender, and authority distinctions. "Children and adults now behave more alike, dress more alike, and share the same video and computer games," he writes.12 Others, like Michael Bugeja, Chair of the School of Journalism and Communication at Iowa State University, are concerned that the virtual world leads to a sense of displacement in our community and home, a blurring of role and identity. He fears that as a nation, we're more absorbed with entertainment than any other culture since Ancient Rome. He feels that we need to be concerned that our youth are being socially transformed by leisure technology that blurs the lines between reality and fantasy and between childhood and adulthood and between the natural world and virtual images. We must, he argues, insure that adequate exposure to the real world of sunsets, trees, animals, and friends is not displaced by psychographics based on technology we use and services we purchase.13

So, can we draw any conclusions here? I think so. The following are my personal conclusions and some facts that I've learned from surveying the video game scene. Are video games good or bad? Undoubtedly some are productive and beneficial. Games are widely used as educational tools, not just for pilots, soldiers, and surgeons, but also for students and business professionals. Each game has its own interface and controls, so that anyone who has learned to play games can figure out how to operate almost any high-tech device.

The First Amendment protection for video games is fully entrenched in our political culture; critics of the content of video games have succeeded only in creating a rating system.

We should focus instead on the prospects of this technology to transform our broader social, educational, and cultural life. Rather than seeking only to improve hand-eye coordination and cognitive muscles, we should strive to improve upon social consciousness and the quality of our interactions with our fellow human beings -- of our own culture and of others.

Internet and broadband connectivity have bridged the generational and geographic divide to create a technologically flat world in which most information is widely communicated.   The potential educational and transformational qualities embedded in gaming technology can now be used to supplement our globalization strategy of reaching out to undeveloped nations where

disease, poverty, and ignorance restrict access to education. Because media and technology are so mobile and available, we must seek opportunities to enhance knowledge and establish global partnerships that will promote human rights and transcend geography.

And finally some interesting facts - Only last month the Nobel Prize for Economic Sciences was awarded to Robert Aumonn of Hebrew University of Jerusalem and Thomas E. Schelling of the University of Maryland for having enhanced our understanding of conflict and cooperation through game-theory analysis. This is the second time the award has gone to game theorists; the first was in 1994, when the winner was John Nash of Chaos Theory, made famous in the movie, *The Beautiful Mind.*

Mr. Schelling did his work as a true social scientist. He specialized in understanding human behavior, and game theory was his primary tool. From issues ranging from the Cold War to global warming, his concept of a focal point, now known as the Schelling's Point, creates an exercise of interactive group behavior in which one individual or group assumes the identity of the protagonist in order to seek full understanding of the contrary approach. This "other shoe," or role-playing model, has been a fundamental strategy of gaming and video games since its beginning.14

Today, more than 50 universities offer courses, majors, and post-graduate degrees in video game theory and culture. Research is being conducted in several prestigious campuses from Stanford to Rensselaer Polytechnic Institute to the University of Pennsylvania. The role of play in human culture, virtual worlds, technology transfer, military simulation, and the social and emotional consequences of gaming are but a few of the studies.

The evolution of video games has begun and now matures on the research university campuses of our country. In less than 40 years we have seen the world flatten in a manner that allows the seamless transfer of information, technology, and skills across continents. One can easily imagine that within the span of Nicholas's youth and Dr. Wolf's career we will see the performance of virtual surgery on other planets by surgeons operating with personal robots. But that will be the subject of another paper. In the meantime, we might wonder what kind of prosthesis modern medicine will need to develop to replace the carpal tunnel and to re-energize the retina.

[i] Steven Kent, *The Ultimate History of Video Games*, UK, Random House, 2001

[ii] Christine Rosen, "Video Games: The Playgrounds of the Self," Washington, D.C., *The New Atlantis, a Journal of Technology and Science*, #9, 2005

[iii] "U.S. District Court in Seattle Grants Motion for Summary Judgment, Overturned; Washington State Legislation to Ban Sale of Violent Games," July 2004, ESA.

[iv] *Computer Games* magazine, May 2003.

[v] "Gangs of New York," *New York Times*, October 16, 2005.

[vi] www.c.s.northwestern.edu/hunicke

[vii] Thomas Friedman. The World is Flat: A Brief History of the Twenty-first Century. N.Y. Farrar, Straus, And Giroux. 2005.

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