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Gaming the System

What Higher Education Can Learn from Multiplayer Online Worlds

J.C. Herz

Computer games and higher education are like species that share an ancestor but have diverged wildly in their evolution. The earliest computer games were part of academic computer science departments in the 1960s. One year after the first PDP-11 was delivered to the Massachusetts Institute of Technology in 1961, the first computer game, Spacewar, had been written by a young graduate student named Steve Russell. The game was, in fact, a way of learning to use the computational behemoth, Russell recalls:

> I thought it was this great thing, and I was itching to get my hands on it. And so a bunch of us started talking about how you could really do a lot more with the computer and the display. Space was very hot at the timeÑ it was just when satellites were getting up and we were talking about putting a man on the moonÑ so I wrote a demo program that had two spaceships that were controlled by the switches on the

> computer. They were different shapes. They could fire torpedoes at one another, and they could navigate around the screen with the sort of physics you find in space.
>
> And then Pete Samson wrote a program which displayed the star map sort of as you'd see it looking out the window, and I incorporated that as a background. And then Dan Edwards looked at my code for displaying outlines and figured out a way to speed it up by a factor of two or three, which gave him enough time to compute the effect of gravity on the two spaceships. And that made it a much better game because with the stars in the background, you could estimate the motion of the ships much better than when they were just on a dead black background. And with the spaceships affected by gravity, it made it a bit of a challenge, and you got to try to do orbital mechanics—there was the star in the center of the screen, and it attracted them just as the sun would.[1]

Even in this first incarnation, computer games exhibited all their signature qualities as a learning experience. All the knowledge and skills acquired in the process of creating *Spacewar* were means to an end: programming physics simulations, allocating resources, representing scale and perspective—all of these were necessary to make the game better; and lo, they were mastered. All of this learning occurred in a collaborative, highly social context—another hallmark of computer games. Furthermore, the social and technological benefits were shared, since *Spacewar* was made available to anyone who

wanted a copy. Within a year of its completion, a copy of the game was on every research computer in America.

For years, computer games flourished in academic computer labs. Ironically, although they were never sanctioned activities, games provided a social nexus for undergraduates and graduate students to cluster and discuss thorny problems while waiting their turn to go head-to-head in *Spacewar*, or to collaboratively figure out how to better allocate network resources to ensure that they could play early online games (and later, stage multiplayer *Doom* marathons) with minimal disruption to the network as a whole. It's amazing how innovative groups of students become when cherished activities are on the verge of being banned.

As computers moved out of the lab and into the living room, budding programmers dedicated their time (and sometimes dropped out of school) to create games for a burgeoning class of enthusiasts. Their products were fly-by-night affairs—labors of love that were stored on floppy disks and packaged in Ziploc bags. They were programmed quickly, played enthusiastically, then deleted (there was never enough room on the hard drive). Because games were processor-intensive and consumer PCs were slow, game designers had to be resourceful and use every known loophole to squeeze extra processing cycles out of putt-putt computers like the TRS-80 and Commodore Amiga. These pokey machines were inferior to academic mainframes in every respect. But because they were accessible, they enabled a growing population of hobbyists to hack away for fun and profit, sharing expertise, if only to show off.

Over the years, a community took root and flourished, informally and organically. When the Internet became accessible to non-academics in the early 1990s, the computer game community (all early adopters) embraced it. Their already robust bulletin-board, magazine, and modem culture migrated onto ftp sites and later the Web. After Id Software opened the source code for the *Doom* level editor in 1994, player modifications exploded as gamers took 3D engines and editing tools into their own hands.[2] As in any Darwinian environment, the fittest creations survived, garnering fame (and gainful employment) for their authors along the way.

By the end of the millennium, nearly every strategy and combat game on the market included a built-in level editor and the tools to create custom characters or scenarios. Nourished by the flexibility of these tools and the innate human desire to compete and collaborate, a dynamic, distributed ecosystem of official game sites, fan pages, player-matching services, and infomediaries flourished. It continues to grow today in an unrestrained, global fashion. As the player population expands, so does the game industry, whose annual sales in excess of $7 billion now rival those of the Hollywood box office.

Meanwhile, computers keep getting faster. As Moore's law persists, and hard drives grow in size and shrink in price, commercial games get better looking and more sophisticated. Graphic accelerators smooth out the edges and goose the frame rate. Faster chips process real-world physics. High-bandwidth connections throw distant opponents into virtual arenas. At every step along the way, gamers have embraced the

many-to-many potential of computer networks, not just to compete, but to collaborate, invent, and construct a networked model for learning and teaching.

If a gamer doesn't understand something, a continuously updated, distributed knowledge base maintained by a sprawling community of players is available from which to learn. "Newbies" are taught by more skilled and experienced players. Far from being every man for himself, multiplayer online games actively foster the formation of teams, clans, guilds, and other self-organizing groups. The constructive capabilities built into games allow players to stretch their experiences in new and unexpected directions, to extend the play value of the game, and in so doing garner status (custom maps, levels, characters, and game modifications are all forms of social currency that accrue to the creators of custom content as it is shared among players).

In terms of the speed and volume of learning—the rate at which information is assimilated into knowledge and knowledge is synthesized into new forms—the networked ecosystem of online gaming is vastly more multidimensional than the 19th-century paradigm of classroom instruction. This is primarily because games fully leverage technology to facilitate "edge" activities—the interaction that happens through and around games as players critique, rebuild, and add onto them, teaching each other in the process. Players learn through active engagement not only with the software but with each other.

In universities, it is widely accepted that much learning occurs outside the classroom. But universities have no coherent

strategy for leveraging that edge activity online. There are online syllabi and course catalogs, threaded discussions that graft section discussions onto threaded message boards, and e-mail between students (and sometimes even between students and teachers). But these activities are not integrated in a constructive way; they don't comprise the kind of socially contextualized learning to which young people weaned on PlayStations are increasingly accustomed.

It's not a question of whether such learning will happen, since the current generation of students is notoriously good at "getting around" institutions that fail to address their needs. The question is whether the university will assume leadership in the innovation process, or whether the standard applications and conventions will be rigged together and disseminated by undergraduates, possibly not reflecting the institution's pedagogical agenda. Perhaps it would be better if students evolve their own best practices in cyberspace, with no regard to disciplinary boundaries or departmental turf, in the cool shade of institutional ignorance. There is, in fact, a good case to be made for this scenario.

Regardless of whether university administrations choose to assume an attitude of benign neglect or take an active role, it must be understood that the dynamics of networked learning differ fundamentally from those of classroom instruction and from traditional notions of distance learning. Whereas classroom instruction is one-to-many, and traditional distance learning (that is, correspondence schools and most online courses) is one-to-one, networked learning environments have

their own design principles, or criteria, by which people and their projects are evaluated.

Online games are an object lesson for academia, not because universities need to be making games, but because online games illustrate the learning potential of a network and the social ecology that unlocks that potential. As higher education strives to transform itself via information technology, it is important to consider not only the hardware and software necessary to achieve that transformation, but also the cultural infrastructure necessary to leverage those resources. To this end, it is useful to learn from the knowledge economy that drives networked games.

Participatory Design and Constructive Learning

The development cycle for a computer game, circa 2001, is 18 months from the generation of the design specification to the release of the product. Production typically involves 12 to 20 people, with costs ranging from $5 to $7 million dollars. But for many games, and particularly the stronger-selling PC titles, the process begins long before the "official" development period and extends afterwards via a continuous stream of two-way feedback between the developers and players.

Perhaps the most salient example of this phenomenon is in-game artificial intelligence (AI), one of the great engineering hurdles in any game. In first-person combat games, there is a marked difference between real and computer-generated oppo-

nents: human opponents are invariably smarter, less predictable, and more challenging to play against. There is no comparison between a multiplayer death match (elimination combat with up to eight people on the same three-dimensional map) and a single-player game with AI opponents. Because of this discrepancy, first-person shooters are, *de facto*, online multiplayer games; several have dispensed with single-player mode against AI opponents altogether.

Like all engineering challenges, however, AI is subject to the million monkeys syndrome: put a million gamers into a room with an open, extensible game engine, and sooner or later one of them will come up with the first-person shooter equivalent of *Hamlet*. In the case of Id Software's *Quake II*, it was a plug-in called the ReaperBot, a fiendishly clever and intelligent AI opponent written by a die-hard gamer named Steven Polge (who was subsequently employed by Id's main rival, Epic Games, to write AI for the Unreal engine). The ReaperBot was far-and-away the best Quake opponent anyone (inside or outside Id Software) had ever seen. The plug-in rapidly disseminated within the million-strong player population, which quickly began hacking away at its bugs even though such modifications were technically illegal. Needless to say, these improvements in game AI were incorporated into the core technology of first-person shooters to everyone's benefit—including the software companies'.[3]

The salient point here is not that *Quake* has great AI, but that its architecture, enables distributed innovation to occur in a parallel, decentralized fashion. Of course, not all players roll

up their sleeves and write plug-ins. But if even one percent contribute to the innovation of the product, that's ten thousand people in research and development.

Most of the players who tinker with combat games aren't programmers. They don't have to be because the editing and customization tools in today's games require no programming skill. Levels of combat games can be constructed in a couple of hours by someone familiar with basic game play. Real-time strategy games offer similar capabilities; new maps, with custom constellations of opposing forces, can be generated with a graphical user interface.

Notably, historical and quasi-historical simulations like Sid Meier's *Gettysburg* allow gamers to replay military conflicts under different conditions (for example, "What if General Lee had been there," or "What if Pickett hadn't charged?"). The flexibility of the framework allows and encourages non-expert, individual players to ask the questions, explore the solution space around a particular scenario, and create novel scenarios that might not have occurred to the game's designers.

In a commercial context, this tool-based, user-driven activity has several advantages. It extends the life of the game, enhancing the value of the product at no incremental cost and increasing sales. The longer people play the game, the longer they talk about it and effectively market it to their friends and acquaintances. Will Wright, author of the best-selling *Sim City* series, compares the spread of a product in this fashion to a virus: "Double the contagious period," he says, "and the size of the epidemic goes up by an order of magnitude. If I can get

people to play for twice as long, I sell ten times as many copies." Wright's formula bears out on the bottom line—his latest game, *The Sims*, has spawned two expansion packs and racked up $340 million in sales since its 1998 release.

The Sims, which scales Wright's *SimCity* down to the neighborhood level, is noteworthy because it illustrates the level of engagement a game can achieve when its designers incorporate player feedback and collaboration before, during, and after the product is released. Four months before the game shipped, its developers released tools that allowed players to create custom objects for the game's virtual environment, including architecture, props, and custom characters.

These tools were rapidly disseminated among *Sim City* players, who began creating custom content immediately. In the months leading up to the game's release, a network of player-run Web sites sprung up to showcase and exchange "handcrafted" Sims objects and custom characters. By the time the game was released, there were 50 Sims fan sites, 40 artists pumping content into the pipeline, and 50,000 people collecting that content. A quarter million boxes flew off the shelves in the first week. A year later, there are dozens of people programming tools for Sims content creators, 150 independent content producers, half a million collectors, and millions of players reading 200 fan sites in 14 languages.[4]

At this point, more than 90 percent of *The Sims'* content is produced by its player population,[5] which has achieved an overwhelming amount of collective expertise in all things Sim. The player population systematically trains itself, generating

more sophisticated content as it learns. This is a completely bottom-up, distributed, self-organizing process.

The analogue of this for institutions of higher learning is not that students should create courses. It is that to become meaningful, online content needs to leverage the social ecology that drives networked interaction. An online learning environment, whether an Internet-only experience or the complement to an off-line course, must give participants the tools to actively engage in the construction of their experiences. It is not enough to simply absorb the content and then reiterate it. There has to be a way for students to take the content and "run with it" by using it in some fashion such that their fellow students can immediately benefit.

Moreover, the system must acknowledge that contribution. In the world of online games, that acknowledgment is quantified in various ways—players know how many times their contribution has been downloaded and how it's been rated by the community. Even if a player's contribution isn't very good, he or she still has some concrete acknowledgment that it has been used, if only by 44 people out of a population of millions (and to that player, 44 people seems like a lot). This acknowledgment fuels participation and invests the player in the experience because it transforms knowledge into social capital. Not only do the players "own" their learning (because they participated in the construction), but ownership is worth something in a social context where one's status derives from peer acknowledgment (an incentive more powerful than grade point average or teacher approval).

One might say, "Oh well, it's easy to talk about constructive participation and peer-to-peer learning in games. They're full of digital objects you can map and sculpt and hone—classes are verbal, and you can't evaluate verbal contributions the same way." But in fact, you can—witness Slashdot (http://www.slashdot.org), a site dedicated to technology news and discussion. Instead of the standard magazine format (staff writers generate articles and readers discuss them) or conventional online communities (loudmouths talk, lurkers read, and the occasional flame war flares up), Slashdot's architecture harnesses the collective intelligence of the network to drive discussion.

Any registered Slashdotter can submit a mini-article or comment, often pointing to outside sources (like newspapers and magazines) that are hyperlinked when possible so that readers can check out the evidence for themselves. These submissions are filtered by moderators and rated on a scale of 1–5. Readers can then designate their "threshold," the minimum score that a comment needs to have in order to be displayed. For instance, if you set your threshold at 2, any comments with scores of 2 or above appear on your screen.

As an individual, higher cumulative point scores (the way your comments have been rated by the community) correspond to "karma" that makes you eligible to moderate. Moderation privileges are doled out on a continuous basis. Every 30 minutes the system checks the number of comments that have been posted and gives eligible users "tokens." When a user acquires a certain number of tokens, he or she becomes a moderator and is given a number of points of influence with which to

play.[6] Each comment they moderate deducts a point. When they run out of points (or when their points expire after three days), they are done serving until the next time they have accumulated enough tokens.

This system rewards people who make verbal contributions valuable to the group, prevents the discourse from being dominated by people who simply like to hear themselves talk, and gives listeners a larger influence and a greater sense of involvement. If you are designated as a moderator, you have to read more closely than you otherwise would (at least for three days) in order to determine which arguments are worth exerting your influence and using tokens.

This complex exchange of social capital is what differentiates this networked experience from a non-networked one. In order to "network" a course, the question is not, How can the content be delivered digitally? but more preferably, What are the students getting out of this experience that they wouldn't be getting in the classroom or library? How does the structure of the experience make the students useful to each other? (that is, how can the collective consciousness of 20, 100, or 600 students be brought to bear on the learning process?)

Peer Acknowledgment and Group Identity

The dynamics that drive mastery and knowledge exchange in and around computer games derive from the social ecology of these games—the conventions of interpersonal interaction

that define status, identity, and affiliation both within the games and in the virtual communities that surround them. Commercial game culture is structured to harness innate human behavior: competition, collaboration, hunger for status, the tendency to cluster, and the appetite for peer acknowledgment. In other words, the forces that hone games (and gamers) have more to do with anthropology than code.

Beyond the technological infrastructure, there is a cultural infrastructure in place to leverage these interpersonal dynamics. Tools and editing modes allow players to create assets (levels, modifications, character models) that extend the game experience. But more important than the stand-alone benefit of these assets is their value as social currency. The creator of a popular level, object, or plug-in may not receive monetary remuneration, but he garners notice, even acclaim, from his fellow gamers.

Game modifications ("mods") are reviewed on thousands of game sites, from fan pages to high-traffic news destinations like *GameSpy*.[7] These rotating showcases serve dual functions in the attention economy of computer gaming. Gamers who want to download new content sift for quality. Content creators hope for widespread exposure. Because game culture is global, well-designed mods are lauded by an international array of Web sites in half a dozen languages. Even game levels and character models[8] ("skins") that require less time and skill are circulated on six continents (probably seven—field researchers in Antarctica have satellite Web access and a lot of time on their hands).

On a more local basis, player-generated content circulates among peer groups, particularly among high school and college students, for whom games are a nexus of friendly rivalry and bragging rights. New levels, skins, and mods provide social fodder and novelty to the networked game marathons that are now ubiquitous in college dorms, high school computer labs, and offices populated by tech-savvy twenty-somethings.[9]

These group dynamics are best represented by the vast network of self-organized combat clans that compete for dominance on the Internet. No game company told players to form clans; they just emerged in the beta test for *Quake* and have persisted for years. There are thousands of them. The smallest have five members; the largest have hundreds and have developed their own politics, hierarchies, and systems of governance. They are essentially tribal—each has a name,[10] its own history, monikers, and signs of identification (logos and team graphics). Clans do occasionally cluster into transnational organizations, adopting a shared moniker across national boundaries and adopting a loose federalist structure. However, clans are generally composed of players in the same country because proximity reduces network lag. In games that require quick responses, this is a real factor.

The clan network may seem anarchic because it is fiercely competitive and has no centralized authority. Nevertheless, beneath the gruesome aesthetics and intermural bravado, it is a highly cooperative system that runs far more efficiently than any "official" organization of similar scale, largely because clans, and the players that comprise them, have a clear sense

of shared goals. Regardless of who wins or loses, they are mutually dependent on the shared spaces where gaming occurs, whether those spaces are maintained by gamers for gamers, like ClanBase,[11] or owned and operated by game publishers, such as Sony, Electronic Arts, or Blizzard Entertainment, the developer of hit games like *StarCraft*, *WarCraft,* and *Diablo II*.

In an educational context, the salient lesson is that the vibrancy of these shared spaces stems from the relationships not only between individuals, but also between the individual and the group and between groups, as well. Individuals do not view themselves merely as sole participants, even within games where they are competitors, because the game establishes ongoing relationships on many levels. Between players, obviously, there is rivalry. But gamers also consider themselves part of a group—their pack or clan or loose amalgamation of friends that gets together, online or offline. There is a sense of common identity and shared goals to which the individual brings all of his or her knowledge, tactical skills, and constructive abilities.

"Mastering the game" in an online, networked environment is a team sport. There are ways for groups to form, bond, and collectively succeed. There are almost no such mechanisms in the academy. Even the message boards associated with class sections, a natural group division, don't offer the section any reason to band together. Course after course, semester after semester, there is the usual vocal minority of know-it-all showoffs; the big middle group, who pipe up when they need clarification; and the inveterate lurkers. It's interesting to ponder

what would happen if students' individual grades were affected by the performance of their section. Graft that collaborative activity onto the Ethernet, and you would have online learning in turbo drive.

"Leveling Up" in a Persistent Multiplayer World

Underlying the dynamics of networked environments is the process whereby individuals are evaluated and rewarded by the system rather than by a specific individual. This process is perhaps most evident in massively multiplayer role-playing games such as *Everquest*, *Ultima Online*, or *Asheron's Call* (maintained by Sony, Electronic Arts, and Microsoft, respectively). Unlike most games, whose playing fields exist only while participants are actively engaged, these online worlds persist whether or not an individual player is logged on at any given time. This sense of persistence gives the game depth and is psychologically magnetic: the player is compelled to return habitually (even compulsively) to the environment, lest some new opportunity or crisis arise.

The persistence of the virtual environment allows players to build value according to the standard conventions of role-playing games (RPGs). In an RPG, a player's progress is represented not by geographical movement (as in console adventure games like *Mario* or *Tomb Raider*, where the object is to get from point A to point B, defeating enemies along the way), but by the development of his or her character, who earns experi-

ence points by overcoming challenges. At certain milestone point-tallies, the character is promoted to a new experience level, gaining access to new tactics and resources, and also attracting more powerful enemies. The better the player becomes, the more daunting the challenges become. Thus, the player scales a well-constructed learning curve over several months while building a level 1 character into a highly skilled, fully equipped level 50 powerhouse.[12]

These characters embody not only skills and resources acquired in the course of play, but also reputations and connections formed and nurtured when the player joins a band of fellow adventurers, or a larger clan, guild, or tribe. Over the course of several years (*Ultima Online* is in its fourth year), much of the player's learning is concretized, qualitatively and quantitatively, in that character's profile: how they rate in various attributes (strength, speed, dexterity, physical resilience, intelligence, charisma), what their affiliations are, and what sort of combat skills and arcane spells they have at their disposal, as well as where they fall on the good-to-evil continuum.[13]

The character is a reflection of every action a player has taken in the virtual environment, similar to an existential self-portrait. Not surprisingly, players are emotionally invested in the statistical profiles of these characters, far more so than they would be in a simple score tally (or grade point average). In a sense, the RPG game persona is the most fully dimensional representation of a person's accumulated knowledge and experience gained in the online environment.

In a deeply networked learning environment, it's not unreasonable to imagine the mechanisms of evaluation shifting to this model, which in some ways mirrors the principles of a liberal education: that students should, in the course of their undergraduate education, apprehend the modes of thinking inherent in physical and social sciences, history, literature, philosophy, logic (in its contemporary designation as "quantitative reasoning"), and the arts. Instead of a binary framework where those requirements are either met or not met, they might be considered attributes that are continuously strengthened, concentrating in the student's field of study, just as an RPG character's experience heightens the attributes specific to the profession chosen.[14]

In this framework, courses, projects, and extracurricular activities are experiences that allow a student to incrementally progress along a number of axes, from quantitative analysis, fluency in a foreign language, and aesthetic knowledge, to leadership and communications skills. Depending on the type and difficulty of the challenges the students assume, and how well they acquit themselves, experience points accrue along these axes (for example, multivariate calculus allows a student to earn up to four points of quantitative reasoning experience, which could map to conventional grades; directing a play might translate into one point of leadership experience).

In this context, leveling up from year to year reflects more than a certain number of hours of class and a certain assortment of grades, which tend to lose meaning outside the context of a particular course, given that grading scales vary

between professors and between departments. Unlike a transcript, this persona-based representation of individual performance gets close to representing the sum of a student's experience. It reflects who they are on the day they graduate, rather than, for example, what they were doing in the spring semester of their sophomore year. It offers students a way to understand their development as a continuum, and how their cumulative achievement reflects both their strengths and the gaps in their development.

This sense of actualized knowledge is the most powerful convention that higher education can borrow from persistent multiplayer online worlds. After all, life for a 21st century undergraduate is a persistent multiplayer online world.

ENDNOTES

1. J.C. Herz, Joystick *Nation: How Videogames Gobbled Our Money, Won Our Hearts and Rewired Our Minds* (New York: Little Brown, 1997), http://www.amazon.co.uk.

2. *Doom* was a milestone in the history of software distribution. The first level was released as shareware, uploaded to the University of Wisconsin server on December 10, 1993. Crumbling under the network traffic bearing down on its ftp site, the system crashed twice. Nevertheless, *Doom* spread like wildfire and generated millions of dollars for Id Software when gamers purchased the full version.

3. For further discussion on the development of 3D game engines as licensable assets, see J.C. Herz, "For Game Makers, There's Gold

in the Code," *New York Times*, 2 December 1999. Archived at http://www.nytimes.com/library/tech/99/12/circuits/articles/02game.html—requires registration but no fee.

4. While most of these sites are labors of love, a few are profitable. "Mall of the Sims" (http://www.mallofthesims.com) is self-sufficient on ad revenue.

5. For further discussion of The Sims, see J.C. Herz, "Learning from the Sims," *Industry Standard*, 26 May 2001, http://www.thestandard.com/article/0,1902,22848,00.html.

6. Guidance to Slashdot moderators, from the site's list of Frequently Asked Questions (http://slashdot.org/faq/com-mod.shtml): "Concentrate more on promoting than on demoting. The real goal here is to find the juicy good stuff and let others read it. Do not promote personal agendas. Do not let your opinions factor in. Try to be impartial about this. Simply disagreeing with a comment is not a valid reason to mark it down. Likewise, agreeing with a comment is not a valid reason to mark it up. The goal here is to share ideas. To sift through the haystack and find needles. And to keep the children who like to spam Slashdot in check."

7. GameSpy prominently features "Mod of the Week" (http://www.planetquake.com/features/motw), "Level of the Week" (http://www.planetquake.com/features/lotw/), and "Model of the Week" on title-specific destinations like Planet Half-Life (http://www.planethalflife.com/community/hosted/mods/shtm) and Planet Quake (http:///www.planetquake.com/features/mdlotw/).

8. In some cases, game skins become cult phenomena unto themselves. Witness the Half-Life Hockey League (http://www.planethalflife.com/hockey/), a labor of love by one very dedicated aficionado, who has modeled the entire National Hockey League (current stars and past legends) as a roster of Half-Life characters. Not

only can you replace Half-Life's generic soldier character with Mario Lemieux, but it's also possible to recast a multiplayer death match as an Eastern Conference face-off between the Boston Bruins and the New York Rangers. Mark Messier and Ken Belanger, running down the halls with automatic weapons, out for blood. . . .

9. At the height of the dot com boom, there were many news stories about companies where 24-year-olds labored late into the night. And it was true that you could find programmers writing code at 11pm on a Thursday. But at that hour there was a lot of Quake on the company LAN.

10. Clan monikers tend toward the flamboyant: The Enterprise Wrecking Crew, The Dangerous Armed Warfare Guild, Pimps with Grenades, Desert Storm Troopers (these guys are from Romania), Belgian Armed and Dangerous, TNT Gamer Clan from the People's Republic of China, and the Army of 12 Monkeys (ranked #1 on the Bosnia-Herzegovina CounterStrike tournament ladder).

11. See http://www.clanbase.com/faq.php#what.

12. Not surprisingly, players are highly invested in the characters they have built up. On a purely pragmatic level, those virtual personas represent hundreds of hours of invested time (which is why high-level Everquest characters sell for thousands of dollars on eBay).

13. Killing other players puts you on the evil continuum, where you forfeit the protection of civilized society. Not only are serial player-killers immediately identifiable as such, but if they wander into a town, they will be attacked by the town guards.

14. It's worth noting that the common professions for RPG characters (such as knights, wizards, clerics, healers, craftspeople, and mercenaries) cater to semi-distinct personality types, just as certain

majors do (like public policy, computer science, art history, folklore and mythology, and economics).

J.C. Herz is the chief executive officer of Joystick Nation, Inc. Reach him by e-mail at jc@joysticknation.com.