Ghost at the Machine:
Internet Addiction and Compulsive Computer Use

by

Rachel Diane VanCott

B.S. Biology
State University of New York College at Geneseo, 2007

SUBMITTED TO THE PROGRAM IN WRITING AND HUMANISTIC STUDIES IN PARTIAL FULLFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE IN SCIENCE WRITING
AT THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SEPTEMBER 2008

© 2008 Rachel Diane VanCott. All Rights Reserved.

The author hereby grants to MIT permission to reproduce and to distribute publicly paper and electronic copies of this thesis document in whole or in part in any medium now known or hereafter created.

Signature of Author:____________________________
Graduate Program in Science Writing
June 9, 2008

Certified by:____
Alan Lightman
Adjunct Professor of the Humanities

Accepted by: __________________________________
Robert Kanigel
Professor of Science Writing
Director, Graduate Program in Science Writing

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
JUL 0 9 2008
LIBRARIES

ARCHIVES

Ghost at the Machine:
Internet Addiction and Compulsive Computer Use

by

Rachel Diane VanCott

Submitted to the Program in Writing and Humanistic Studies
on June 9, 2008 in Partial Fulfillment of the
Requirements for the Degree of Master of Science in
Science Writing

ABSTRACT

Technology use—particularly the use of the Internet—is a pervasive component of modern society. The Internet has changed the way we work and the way we play, creating new possibilities for self expression and communication. But it also enables (and possibly encourages) compulsive behavior.

Internet Addiction is the compulsive use of the computer and the Internet. Internet use is considered compulsive when the user engages in the behavior to such an extent that he is no longer able to meet his responsibilities and physical and emotional needs.

Case studies and experts from the realms of medicine and media studies provide a description of the disorder and some of the causes that contribute to the dysfunctional behavior. The author also tackles a larger question: What does Internet Addiction mean in the context of our modern society?

Thesis Supervisor: Alan Lightman
Title: Adjunct Professor of the Humanities

Joining Channel: [1. General- The Barrens]

A rumble and rolling drum beat sound as the computer game starts up, followed by high tempo music. A moment later, the screen displays a swirling vortex behind an ancient stone doorway and a text field where I type in my account name and password. The key goes through and I click on the image of my character: a hulking steer-like biped, arrayed in green armor, wielding a hammer. When I started this game months ago, I affectionately named the burly cow "Thumper."

In the game, my character charges down a dirt road and I begin to scan the digital savanna known as The Barrens. This is World of Warcraft (WoW)—an online game that brings players into a complex virtual world where they battle monsters or each other, completing quests and forming alliances. I no longer play, but I've come back to satisfy a nagging curiosity. There's a chance that what I'm about to type might get me laughed out of The Barrens.

[Thumper]: ...does anybody really think they're addicted to World of Warcraft?[1]

BarrensChat is a chat line for players. They can type into it to sound the alert when enemies attack, or seek help with difficult tasks. But most of the time, players just use BarrensChat to tell awful jokes and ridicule one another. So I don't know what to expect.

For the first moment, nothing happens, and I think that my question will be ignored. Then responses start to trickle in:

---

[1] I've chosen to clean up the text that was from the game, by adding nuanced punctuation. Otherwise, lines from the game are treated as direct quotes.

[Valanx]: I've known many people that are, Thumper.
[Desecrate]: this game is easy to get addicted to
[Valanx] whispers: I used to be addicted as well
[Katojones]: you're playing WoW and you're researching addiction?????????
[Desecrate]: I think that's a sign of your own addiction
[Valanx] whispers: used to play for 12-13 hours straight
[Valanx] whispers: %^&*ed up my life once
[Valanx] whispers: got kicked out of my house and my girl threatened to leave me
[Valanx] whispers: ...I know what it's about.

His real name is Josh.

He doesn't want to stop playing, but he wants to tell me more. So we talk over a voice communication system built into the game. Throughout our conversation, the sound of his voice is punctuated by the click of fingers on keyboard and the occasional sharp exhale and muttered curse as he continues to play.

Josh, now nineteen, described himself as a jock. A fairly average, if popular, boy who grew up in his parents' home in California and played sports in high school.

"I've always been known as a tech-savvy kid," he said, "but I didn't want to be labeled a nerd...I never told people that I played World of Warcraft ... it was kind of a secret for me."

Despite concerns about his reputation, Josh enjoyed playing the game. In fact, he started to play it so much that he found himself neglecting the rest of his life. "To tell you the truth," he typed in an online conversation, "I think I was trying to live vicariously through my toon [online character]."

To make his online persona the best that it could be, Josh joined a guild, a group of players who, though they've never met in person, meet up in the game world, support each other, and work together to complete adventure quests. Next, Josh joined a raiding guild—an even more competitive team of players who work together to conquer cities and towns or other teams. To stay on top, the players always need to obtain better weapons and armor for their characters. That means more play time. Josh recalls hours spent "farming" in-game items, scouring the fields and forests of the game, gathering materials that could be used to make better armor and tools.

He spent hours, days, sitting and staring at the screen, deftly clicking away while his avatar fought and killed virtual monster after monster so that he could collect their hides. Some play sessions lasted for twelve hours straight.

Because he was worried about what his "real life" friends would think if they knew that he played, Josh hid his game play and cut himself off from those that he used to spend time with.

"I didn't want to seem like a loser to them," he said, "so I'd say 'I'm sick, I can't go out tonight.' I'd play WoW [World of Warcraft] instead." Nothing in the real world was as appealing as staying in the game. For Josh, and many of his friends, the Internet was a mask that allowed them to be more open with people, say things they'd never say in real life, do things that they'd never do. The actual world just couldn't deliver, in terms of what it allowed them to do, and how it made them feel.

"It got to the point where even if I wasn't playing or farming," he said, "I'd sit around in Ironforge [one of the major cities of Azeroth, the fictional world of the game] ... I'd run around in circles and just duel people all day. When I wasn't working, on days off, my entire day revolved around WoW."

But living in Azeroth took a toll on Josh's personal life. “Sometimes it gets hard when you're playing hours on end... it gets hard to distinguish in-game aggression and real life aggression,” he said, “Your roommate will come into your room and tell you to do something and you'll just get pissed off and yell at him. That's actually how I got kicked out of my house.”

Thrown out of his house for yelling at his parents and struggling with his self-imposed alienation from friends who didn't play, Josh realized it was time to quit. But it wasn’t that simple. “You get withdrawals,” he said, “Especially if you quit without your buddies. You go over to their houses and they're playing it and talking about it and...you think: 'Maybe I'll just go back and play just a little bit.' It's an addiction.”

It's not an addiction. Not technically speaking. Not like an addiction to opiates or alcohol. But Internet Addiction is what everyone, from reporters to clinicians, calls it.

Behavior like Josh's is what psychiatrists call an impulse control disorder. It's more like an eating disorder than alcoholism. People who have it struggle with a sense of compulsion, infatuation, obsession, centered on a specific behavior such as Internet use. But it's more complicated than that. Those who suffer from Internet Addiction are dysfunctional in other aspects of their lives as well.

Excessive gaming isn't the only type of Internet Addiction. The use of online pornography, chatrooms and social networks, online gambling, and even shopping on e-bay can all become complicated, compulsive behaviors that leave addicts and their families searching for help from therapists and support groups.

Being thrown out of his house was a wake up call for Josh. With the help of a friend who also wanted to quit, Josh found new activities that took him out of the game and back into the real world. Josh was able to recover from his obsessive game play without the help of a therapist. He still plays for a few hours each day before bed but, he insists, he plays only for fun and he doesn't let his game play keep him from his new goal: getting a degree in electrical engineering from a trade school in California, where he lives. He's reconnected with his family as well. Now he goes on long hunting trips with his father and spends time at the gym rather than with his computer.

Josh's story has a happy ending, but how and why did he develop such a problem with his Internet use? Psychologists who treat Internet Addiction suggest that anywhere from six to fourteen percent of Internet users may have problems with compulsive Internet use. What does that mean? Is the computer causing this problem, or is it enabling a pre-existing disorder? Where does one draw the line that distinguishes dysfunctional Internet use? Psychologists still argue over the nature of the disorder and how to diagnose and treat it. Bigger questions skulk beneath the academic quibbles. What does Internet Addiction mean in the context of our modern society?

"Oblivious to their bodies and to the world in which they move"

Technological change has always been accompanied by equal parts enthusiasm and anxiety. When the telephone was introduced, some feared that using it could result in deafness or electrocution. In 1915, American sociologists Robert and Helen Lynd quoted residents of a small town who complained that the automobile destroyed the unity of the family. "In the [eighteen] nineties, we were all much more together," lamented a housewife. Later, in Robert Putnam's 1995 book Bowling Alone, he declared the television to be a medium that engendered isolation and discouraged community involvement.

The first investigations into Internet Addiction are based on the same technophobic prejudices. The cases that we see today however, represent a different phenomenon entirely.

The Internet began as a research network—a clever system that allowed government researchers to remotely share expensive equipment. At first, the network connected only four points: UCLA, UC Santa Barbara, the University of Utah and Stanford. It was capable of transmitting only simple text messages. But by 1972, ARPANET linked dozens of academic computing centers. A decade later, the National Science Foundation created its own complimentary network that became the backbone of what we now know as the Internet.

In the early 1970's, computer technology hadn't yet reached the mainstream. Computers were too expensive for the average person to own, and Internet use was mainly limited to research scientists and university students who had access to the connected computer mainframes. But even in that small pool of professional users, cases of excessive computing started to attract attention.

Commenting in 1976, MIT professor Joseph Weizenbaum was one of the first to remark on the dysfunctional relationship he saw between some computer programmers and their terminals. They'd program excessively, aimlessly. Weizenbaum described the computer "junkies" in Computer Power and Human Reason as "bright young men of disheveled appearance, often with sunken glowing eyes. ...They are oblivious to their bodies and to the world in which they move. These are computer bums, compulsive programmers...[they] can barely tolerate being away from the machine."

Intrigued by Weizenbaum's description and emboldened by psychologists who were investigating the same phenomenon, Margaret Shotton decided to study compulsive programmers. By the time the Loughborough University of Technology doctoral student concluded her work in 1989, she reported that fears of computer addiction were unfounded. True, the programmers spent vast periods of time using and thinking about the computer. But they weren't unhappy. They didn't feel out of control. In short, they didn't have a problem. Programming was a hobby, and a method of self expression, not a compulsive behavior.

Nor did the programmers agree that the computer was the cause of the excessive behavior. To the observer, the constant programing seemed obsessive and isolating, but to the programmers—who admitted they'd always been shy and reclusive—it was a chance to be social in a new way. With machines. They wrote to the computer, and the computer reacted.

"Never before has there been an activity such as computing which could give the distinct impression of providing companionship and partnership," Shotton wrote in Computer Addiction: a Study of Computer Dependency. Shotton made a virtue of the computer-programmer relationship, comparing the devoted hobbyists to monks or sculptors, and she dismissed the declarations of dependency as a misunderstanding of the behavior.

Confusing a love of the early computer for an addiction is an understandable mistake. By the late 1970's, computers were more affordable than ever before, but few would call them lovable. The Commodore PET came with a chiclet keyboard, too small to type on. To do anything with the computer, users needed to program it using the programming language BASIC. Even after prepackaged programs became available years later, computers didn't seem an efficient way of doing everyday tasks.

“Why would I want to [use a program to] turn my $3,000 computer into a $6.95 recipe file? Or an $8.95 Rolodex? Or a $3.95 desk calendar? Or an 89-cent notepad?" Washington Post writer T.R. Reid asked in 1984.

Computers are fit only for “power users and computer junkies,” lamented writer Michael Schrage in 1985. But as time progressed, computers became easier to use. Point and click interfaces broke down the barrier created by text-only operating systems, and the Internet became more enticing. In the early nineties, the creation of HyperText Markup Language (HTML) led to the World Wide Web, which allowed users to share graphics and formatted text through the Internet.

When the National Science Foundation decided to widen the scope of the Internet, allowing access to businesses, private companies began providing dial-up service and the Internet population boomed.

As more companies offered Internet access to the public, its maintenance and control fell to Internet service providers and their subscribers. By 1994, America Online, the most popular home connection service at the time, boasted one million subscribers. The computer rose from hobbyists' toy to household appliance. That popularization marked the onset of the first cases of Internet Addiction.

The Inter-networked computer was something new. Now the computer provided more than just the illusion of companionship. There was a whole world inside that box. And the world inside the computer was always open. New users found it easy to lose track of time while surfing and chatting on the Internet. Users joked about their friends or spouses being "addicted" to the computer.

In 1995, the media picked up on the story. News reports began to detail cases of "net-aholics." Reporters asked big and seemingly important questions of the medium. Would technology take over our lives? Therapists and researchers plumbed the depths of cyberspace, immersing themselves in online communities and exploring graphical chat rooms where users could type messages to one another and engage in role playing games.

That year, a survey conducted by the Emerging Technologies Research Group at MIT reported that 9.5 million Americans were using the Internet. A Nielson study conducted at the same time provided more information about those users. Most were academic professionals, students or people who worked in the computer industry and had completed at least some college education. They spent, on average, about five and a half hours online per week.

In 1996, Kimberly Young, a freshly minted psychologist from the University of Pittsburgh at Bradford, presented the results of her ambitiously titled paper, "Internet Addiction: The Emergence of a New Clinical Disorder." Armed with a diagnostic questionnaire cribbed from the criteria for pathological gambling, Young interviewed

Internet users, just as Shotton had interviewed programmers. More than six hundred users filled out her survey.

Of those surveyed, more than half self-identified as dependent users of the Internet by answering yes to more than five of the eight diagnostic questions which asked things like "Do you feel preoccupied with the Internet?" and "Have you lied to family members, therapists, or others to conceal the extent of your involvement with the Internet?"

Just like Shotton's computer bums, Young's sample of Internet addicts used the Internet as a social outlet. But unlike Shotton's subjects, who said they felt enriched and emboldened by their excessive computer use, Young's subjects were struggling and frustrated by their inability to turn away from the computer and the Internet.

Young's study received a lot of press coverage, and news stories cast the computer as the root of the problem. These stories made the Internet seem like a dangerous, insidious, addictive substance.

"It's a silent addiction that sort of creeps into your home," said Young, in a 1996 interview with the New York Times, "It's just a computer and it seems so harmless." News stories had already presented the Internet as a digital jungle, the meeting place of sexual predators, Neo-Nazis and drug users. Now stories of addiction added a new note to the fears, portraying the disorder as a disease that could suck in any unwary user.

"Those struck by the disorder go on-line more than 20 hours a day, surf the Net when they're busy at work and even eat in front of the computer screen," announced the Wall Street Journal.

The news reports missed a crucial line of Young's research: Internet addiction, as she described it, seemed set to fade over time. Most of the people who qualified as addicts were new users. People who'd been online for more than a few years rarely showed signs of Internet Addiction. Internet Addiction appeared to be a passing fad.

"The effect of television wore off after a while and then we had videocassette recorders and then we had cellular telephones and then we had video games. And now the Internet is once again giving us a high just like TV gave us a high," said Nelson Thall, a research director at the Marshall McLuhan Center for Media Sciences in Toronto. Give it time, media researchers suggested. The novelty will fade and the problem will go away.

More than a decade later, the novelty has faded. The problem hasn't. Some of Internet Addiction may have just been a part of the technology's introduction into society. But today's Internet Addiction represents a definite pathology.

What is Internet Addiction?

As of the 2006 census, nearly seventy-three percent of Americans have access to the Internet and many of them use it on a regular basis. Experts suggest that one of every twenty Internet users is addicted. Beyond that, little is known about the population of addicts. Some early reports suggested that middle-aged housewives were most susceptible to the disorder. Others argued that young male students were most likely to become addicts. Modern psychologists report that those under forty seem most susceptible to the disorder, but they don't draw any further conclusions.

What does it mean to be an Internet addict? Modern estimates are more general than the first descriptions of the disorder. In a recent editorial in the American Journal of Psychiatry, Jerald Block, a psychiatrist from Portland, Oregon, wrote that Internet addiction comes in at least three subtypes: excessive gaming, sexual preoccupations and email/text messaging. All of those subtypes are indicated by the following four criteria, or symptoms:

> 1) *excessive use*, often associated with a loss of sense of time or a neglect of basic drives, 2) *withdrawal*, including feelings of anger, tension, and/or depression when the computer is inaccessible, 3) *tolerance*, including the need for better computer equipment, more software, or more hours of use, and 4) *negative repercussions*, including arguments, lying, poor achievement, social isolation, and fatigue.

Those criteria form a useful starting place but, like many technical definitions, they don't say much. How do you measure excessive use? Is ten hours a week too many? Twenty? Forty? The second and third points also lack precision. Take out the italicized word and the symptoms describe how most people feel about their hobbies. For example, someone who practices martial arts regularly may be upset and depressed if her class is canceled. If she enjoys it, she may want to join a second class, and spend more time at the gym. The fourth criteria is the operative one. That's the difference between a hobbyist and an addict. An addict's computer/Internet use causes negative repercussions.

In fact, psychoanalyst Shavaun Scott diagnoses Internet Addiction almost entirely according to a question that reflects the fourth criteria: Is computer or Internet use causing significant problems for the user? Specifically, is his computer or Internet use blocking his ability to function in the real world?

Some of the negative repercussions associated with Internet Addiction aren't difficult to recognize. An addict may stay online so much that he stops bathing, sleeping, eating, and taking care of his family or himself. He may stop going to work, or to school. It's not just that he spends a lot of time online. It's that he spends time online at the expense of everything else in his life—his personal goals and values, and his physical and psychological well-being.

Because everybody has different goals, values, and responsibilities, diagnosis varies from person to person. "If you have four or five kids, and you're gaming five or six hours a day, you're not taking care of your kids properly. That's pathological," said Scott. But someone who has very few responsibilities and a job that requires little effort could game for five or six hours a day without running into problems.

Scott has been treating adolescents since 1991, but she's only been asking them about their Internet use since her own brush with compulsive play. After watching her sons play (and cajoling them to quit playing) the Massively Multiplayer Online Role Playing Game Everquest, the red-headed mother of two decided to join in and see what the attraction was. When the boys started a new game, Lineage II, she jumped into the online fantasy land alongside them. Soon, she found herself caught up in the game. In fact, even after her sons lost interest, Scott kept playing.

"I didn't like the play as much as I liked the graphics and the alternate world, and the friends," said Scott. "I met people from all over the world and it was a beautiful virtual place to be." But as she was leveling her character and playing with her clan, Scott, an addiction specialist, took a look at her own behavior. She remembers asking herself if the game play was productive or healthy and, more importantly, if she really wanted to spend so much of her life doing it.

Intrigued by the way that she'd been drawn into the game, Scott started asking patients about their Internet use. In many cases, knowledge of her patients Internet use helped Scott create a stronger patient history. And in some cases, the answer to her question revealed cases of compulsive Internet and computer use. As her knowledge of Internet Addiction grew through her experience, Scott became known as an expert on the matter and started teaching treatment techniques to other clinicians. She also started seeing referrals from therapists who weren't sure how to handle the complex behavior that their patients wanted help with.

"Most people who contact me are having tremendous problems," she said.

Internet Addiction has been cited in some graphic incidents. Most notably, in November of 2001, a young Wisconsin man named Shawn Wooley quit his job to spend more time playing the online game Everquest. A week later, he committed suicide. His mother, who blames the game, found his body in the computer chair in front of the still-running game.

In December of 2004, 13-year-old gamer Zhang Xiaoyi reportedly left a note saying that he wanted to "to join the heroes of the game he worshipped,[sic]" and jumped to his death from a 24-story building. His parents decided to sue the company that makes World of Warcraft, claiming that their son's suicide was related to his excessive game play.

In June of 2005, a Korean boiler repairman by the name of Lee Soung Seop was fired from his job after he repeatedly missed work to play online computer games. On August third of that year, he went into an Internet cafe and played the game Starcraft for nearly fifty hours—resulting in cardiac arrest from exhaustion and dehydration. He died in the hospital soon after.

Later that year, a Korean couple left their four-month-old daughter alone for five hours while they went to an Internet cafe to fulfill their daily routine of World of Warcraft play. The daughter died of suffocation before they returned. The parents were charged with criminal neglect.

These cases are often referenced in debates over the nature and severity of Internet Addiction. They represent some of the worst problems linked to the disorder.

What causes Internet Addiction?

Sometimes, compulsive Internet use is an attempt to escape from life stresses. When Scott was taking the history of one of her patients—a young girl who had dropped out of high school to compulsively play online games—she found that the patient had been raped. The girl was withdrawing into the game so that she could get away from what had happened to her in the real world. Similarly, some addicts eschew the natural world and compulsively commit to a digital fantasy to escape from unsatisfying, high stress jobs, or extensive amounts of debt. Others throw themselves into compulsive Internet use to satisfy sexual and social needs when real world relationships fail.

Stressful situations contribute to the development of the disorder, but most addicts also have more than one clinical psychological disorder. “I would say about ninety percent of these cases, actually, one hundred percent—I can't think of one exception—have a comorbid disorder,” said Block. Patients with comorbid conditions have symptoms of more than one psychological disorder. So in addition to an Internet Addiction, the patient might also be clinically depressed, have anxiety problems, a personality disorder, or obsessive compulsive disorder.

That makes it hard for clinicians to tell how and if one disorder is causing another.

Is Internet Addiction just a symptom of depression or social anxiety disorder? Is the depression a symptom of Internet Addiction? According to Scott, the answer to each question could be yes, depending on the patient.

The first scenario is true for one of the patients that Scott is currently treating. “He's extremely uncomfortable with people in real life,” Scott said, “He can't make eye contact. He'll either look away or close his eyes. Incredibly bright guy...But he can't sit in a room with other human beings.”

Scott's patient has Asperger's Syndrome, a type of autism that makes it difficult for him to socialize. He escaped into excessive and then compulsive gameplay to avoid his real world problems. In the game, he could build social ties and friendships. In the game, his inability to make eye contact and use non-verbal forms of communication, like appropriate facial expressions and gestures, didn't matter. But his compulsive play is preventing him from achieving his goals. Despite his brilliance, he's not going to move out of his mother's house and get a job unless he finds a way to come back into the real world.

In other cases, Internet Addiction may be causing the other disorder. In a recent letter posted to the medical community, Block recalled a patient, SW, who came to the psychiatrist for treatment of depression after several suicide attempts. As SW laid out his history of depression, he mentioned that he frequently played an online game—World of Warcraft. Curious to see if there was a link, Block asked to hear more about SW's gaming.

"He noted that he had plenty of work and money before discovering World of Warcraft," wrote Block. "SW found himself thinking about the game while at construction jobs, often rushing home after work to play. He dreamed about the game, craved its use, delayed logging off of it, hid the fact that he was playing it from others, and felt miserable when he was unable to play." He quit his job to stay home and play. Facing homelessness after he could no longer pay his rent, he moved in with an ex-girlfriend to keep himself off the street. But at her house he found himself unable to connect to the game. And when he had to witness her lovers coming to the apartment... That's when he attempted suicide.

What happened in this case? The suicide attempt stemmed from jealousy and depression. But the depression may have come from the problems caused by SW's obsessive online gaming. The obsessive gaming itself may have stemmed from the patient's history of pathological gambling, or it may have been his response to life stresses. In complicated cases, the line of causation is tangled.

SW's case brings up another interesting question. What does it mean when a man becomes so wrapped up in an online game that he dreams of it at night and craves it when he's awake? What does it mean that he obsesses over it so much that he fails to take care of his most basic needs? It might indicate a deep dissatisfaction with his day to day life, or it might just indicate how Internet use has become an ingrained part of the modern psyche.

Scott argues that clinicians should ask all patients about their Internet use. Even if the patient isn't having problems with compulsive computer use, Internet use is a part of his day. It's a significant part of his life. "If someone tried to understand me without understanding my use of the Internet, they'd be missing fifty percent of my identity," Scott said, "Some of the relationships—the people that I'm closest to in the world, I've known only online."

It's clear that, in many cases, Internet Addiction is the result of both a desire to escape stressful situations and other psychological disorders. But why does the addict compulsively use the computer rather than engage in compulsive gambling or develop a substance addiction? In addition to being more socially acceptable than other compulsive behaviors, online activities hold an attraction that may appeal to addicts in a way that other forms of escapism don't. Excessive gaming is the subtype of Internet Addiction that holds the most measurable attraction. It also seems to fascinate the media, frighten parents and confuse many therapists. It's what drew Scott and Block to study Internet Addiction.

Computer Bums and Compulsive Gaming

Computer games come in all varieties, ranging from text based adventures to epic quests set in lavish graphical worlds. Massively Multiplayer Online Role Playing Games (MMORPGs, or MMOs)--the games where many users log onto the same server and play in the same game space--like World of Warcraft, are most often linked to compulsive use. Media researcher Nick Yee has been studying the psychology and culture of online games since 2001, when he collected over twenty thousand surveys from four thousand players of the popular MMORPG Everquest.

When a user finds himself stuck in Internet Addiction, that's the result of two forces at work, said Yee, a push and a pull. The push is the comorbid disorder or life stress. But the pull comes from the experience of gaming. For some, playing an MMO is a unique and engaging pursuit that's unmatched by any other type of entertainment medium.

“I can watch a film, an adventure film, that's exciting and be engrossed in it. But I have no trouble putting it on pause, getting something to eat or going to the rest room,” said Scott, thinking back on her brush with compulsive play, “...when I'm in an MMO I won't eat, I won't go to the bathroom. All the stories about people peeing in bottles are true.”

Researchers link the attraction of online games to three qualities that are found only in this media type: the in-game reward schedule, the social environment of the game, and the endgame structure.

In World of Warcraft, there's a simple formula by which a player can make his character stronger and better. The character receives experience points for killing monsters or completing tasks called quests. After the player has earned a certain number of experience points, the character is promoted to a higher numbered level (a measure of status) and gains new abilities and skills. At first, the levels pile up quickly, but as the player rises in the ranks, levels become harder to achieve.

This leveling system can act as a regular reward, Scott explains, and it encourages players to keep playing. Reward reinforcement systems go back to B.F. Skinner, the famous Harvard Psychologist who studied operant conditioning. In the early twentieth century, Skinner set up an experiment intended to show how behaviors are learned. He placed hungry rats in a chamber that held a lever. When pressed, the lever released food into the chamber. Once the rats learned to press the lever for food, Skinner started changing the system to see how the rats responded.

In one trial, food was released at a steady rate, regardless of how often the rat pressed the lever. In another trial, food was released every certain number of times the lever was pressed. In another, food was released after the lever was pressed a random number of times.

The leveling system in these games can be compared to the second chamber. After a certain number of monsters have been killed (pressing the lever a certain number of times), the player achieves a higher level of experience (food is released). That encourages play, but it's not the most attractive rewards schedule. That distinction goes to variable rate reinforcement—the third example from Skinner's experiment. When the food was released after random number of lever presses, rats spent the most time pressing the lever. Sometimes, killing monsters in an MMO gives a player more than just experience points. Sometimes, when a player kills a monster, he finds special items or weapons. But those rewards occur randomly. Since the player has no way of knowing when that will happen, (just like the rat who doesn't know how many times he'll need to press the lever to get food) the player is encouraged to kill as many monsters as possible.

Because those reward systems are part of the game, part of the play environment, some researchers have criticized the companies that make the games—particularly the makers of World of Warcraft and Everquest, Blizzard and Sony Online Entertainment respectively—for making them "addictive."

According to MIT Professor Henry Jenkins, game development companies aren't trying to create an addictive experience. It's not in the company's economic interest to do so.

"The game industry... has every reason not to build games that are addictive," said Jenkins. "If you're pricing your services on the assumption that people spend twenty hours and they spend sixty hours, that's a drain on your capacity and it costs you much more money than you're taking in." The game industry wants to create an engaging and enjoyable experience, but not one that breeds compulsive use. Higher profits come from gamers who log in frequently enough to keep paying the monthly fee charged by the game makers, but don't play for long hours.

There's evidence of this restraint within the game itself. In World of Warcraft, players are rewarded for taking breaks from the game. Logging off and letting their characters "rest" boosts the experience points that they receive for routine task—like killing monsters or completing adventure quests.

Scott isn't so sure that the company's efforts to curb excessive play are all that sincere. She jokingly recalled a notice that pops up in the game GuildWars. It says: "You have been playing for two hours. Consider taking a break."

"It's like 'yeah right, sure I'm going to take a break. I'm in the middle of a quest!'" said Scott.

The social structure of online games also encourages constant play. Most MMOs are designed to be played with in-game friends. As a player reaches higher levels of achievement, he starts to take on assigned adventure quests that can't be completed by just one player. So, like Josh did, players join guilds. Membership in those guilds, which is necessary at higher levels, comes with responsibilities. Guilds are run entirely by players, but the groups require their members to be in the game world for a certain number of hours each week and the groups have designated "raid nights" that all members need to attend. Because these games are played with others, there's no chance to take a break. The game happens in real time, there is no pause button. If you walk away from an MMO to go to the bathroom, your friends might lose a battle and their characters might die.

Scott recalled a patient who come to her office for treatment of his compulsive game play. He'd had to leave college, lost his job and his girlfriend, and in fact, he said, he was missing an online raid just to be at his therapy session. While Scott and the patient were in session, he received a call on his cell phone. It was a guildmate, angry that the patient wasn't in the game.

"'We need you right now! You're supposed to be there. You're expected to be there four nights a week,'" Scott recalled the guildmate complaining. "And [the patient] went through tremendous guilt right before me. He was a very good player and they wanted him, even to the point of calling him on the phone and inducing guilt that way."

The player spends so much time in the game that he neglects his real world social life. So when an addict tries to step away from the game, he may feel like he's stepping into a void. His social networks don't exist in the real world anymore. His online social network does. It's easy to get pulled back in by a group of players that say they need or want you to be with them.

Another game mechanic that provides pull is the endgame structure.

"There is no winning in this game," Josh said, thinking back on his days of compulsive play. "A lot of people don't understand it." In World of Warcraft, players can reach a maximum level of 70. But the game doesn't end when a player reaches the highest level. High level players compete against each other to obtain special limited availability weapons and tools, which the game's parent company, Blizzard, releases on a regular basis. And high level guilds battle against each other in a complex endgame.

"You never win," said Josh, "This is an ongoing pursuit of something that is almost right in front of you the whole time, but you never reach it.... new stuff is always coming out. It just spirals out of reach."

Within the gaming industry, developers and players use the word "addictive" to describe games that provide a fun and engaging play experience. But that word choice has caused confusion for non-gamers who associate the term with Internet Addiction. Game worlds are engaging and attractive. But the pull of these games isn't enough to cause a healthy person to develop Internet Addiction.

Treatment

Psychologist Kimberly Young, who runs the online center for Internet Addiction Recovery, and psychologist Maressa Orzack, of Harvard Medical School's Mclean Hospital, both treat Internet Addiction through cognitive behavioral therapy. Cognitive behavioral therapy is the general term for therapy that's based on the idea that thoughts, rather than external events, cause feelings and behavioral patterns.

"We look at what are people saying to themselves," Orzack said. Are they having "all or nothing" thinking, where nothing they do in real life ever seems good enough? Are they personalizing failures and convinced that somehow everything that goes wrong is their fault? That kind of negative internal voice could drive users to escape into the computer to the point of compulsion.

Cognitive behavioral therapy is one type of psychoanalytic treatment, but Scott believes that good therapy depends upon a distinctly collaborative approach between psychoanalyst and patient.

Over the phone, Scott roleplayed an example of the kind of patient that she commonly sees. In this case, it's a twenty-two year old girl who plays online games for thirty hours a week, has recently gained weight and is about to be thrown out of her house:

"Where do you want to be specifically, in six months, in a year, in five years, ten years?" a therapist might ask this patient.

"I want to be working in the medical field in a year, I want to be an RN," the girl might reply.

"Okay," says the therapist, "What do you need to do to get there? What do you need to know to get there... starting today."

"I need to apply to the nursing program."

"How are you going to do that? You need to get your transcripts together… can you do that this week?"

"Basically," said Scott, stepping out of the scene, "You make a very very concrete plan." By pinning down the patient's goals, both patient and therapist can clearly see how the problematic behavior is causing functional impairments that stand in the way of the patient's goals. If the patient's problem is social, rather than professional or academic, treatment still involves making a discrete plan that can change the patterns of behavior.

"Generally, for people who have a gaming issue, there are things that they used to do that brought them joy but they don't do them anymore," said Scott. She goes back into conversation with her imaginary patient:

"I used to like to go out to clubs and doing things with my friends...I quit doing that when I played WoW," the patient might say.

So the therapist follows up on that point, asking if the patient could make contact with old friends.

"Oh, I haven't talked to them in three months," says the patient.

"Well give them a call," the therapist might prompt, and then they set a concrete goal that the patient has to meet: calling her old friends before the next therapy session.

The intervention that a therapist suggests might be as simple as writing out the plans for how to deal with situations where the patient is tempted to go back to compulsive use, or how to work on all the little problems that have arisen because of the Internet compulsion. Scott describes asking the patient to plan out and write down how she'll start to look for a job and a place to live. She also describes talking to the patient about finding ways to solve the problem caused by the inactivity associated with Internet Addiction: her weight gain. By making a record of these plans the patient makes a commitment to herself and to the therapist.

These treatment methods focus on replacing the compulsive behavior with healthy alternatives—exercise and socializing. If the patient is found to have a biological depression, or another type of comorbid disorder that can be managed with medication, the therapist would consider a psychiatric intervention.

Though it might seem like an obvious choice, therapists rarely ask an addict to completely stop using a computer or the Internet. Internet use is an important part of the modern professional and academic life, and abstinence from Internet use isn't a realistic or desirable goal for patients. But therapists do use other tricks that are designed to disrupt the compulsive way in which addicts use the technology, like breaking old routines, asking patients to abstain from using the computer at certain times of the day or night, or alternating nights spent in an online game with nights of family involvement.

How long does it take for someone to break the habit?

"It's unique to every person," said Scott. "I see most people progress with three months of therapy with follow-up appointments on an as-needed basis." In general, standard therapy appointments are thirty minutes to an hour long, after the introductory session, which usually lasts ninety minutes. Depending on the complexity of the case, patients may need to see the therapist multiple times per week, or they may meet with the therapist less frequently. For more complicated cases, where the Internet use is clearly a form of self-medication, therapy may go on for years before the patient finds a way to rebalance his life.

"We cannot push someone to make a change they do not want to make," said Scott, "We're not that powerful. We can try to enhance their motivation to create a happier more fulfilling life, but we can't force them to... I think treatment is always successful to some degree if a person feels they benefited from it." Ironically, that doesn't always mean that a patient stops engaging in the behavior. They could just be better at communicating about it with their loved ones, or have a better understanding of their behavior and themselves.

Addicts become addicted because the behavior works for them. Aside from the attractive qualities of the Internet, Jerald Block suggests that the computer provides two main benefits for the addict: companionship and stress release.

“There's a clinical phrase—significant other—that we use that was coined back in the 50s,” said Block. “It was used to talk about the relationships of people.... The computer itself becomes a significant other. [Addicts] spend so much time and so much energy that they learn what the clicks of the disc drive mean, they learn the particular peculiarities of their computer software . They know when things go wrong even before something indicates the thing goes wrong. And God forbid the hard drive goes, falls apart or something. They go into major crisis when that happens.”

A second function that the computer serves is as a preoccupation. An addict's online activities take up an immense amount of time. So if a well-meaning therapist tells the patient to stop using the computer completely, the patient faces a scary situation. He's been told to break off one of the most significant relationships in his day to day life—his relationship with the computer and all of his online friends. He can't use the computer to deal with his stress, and he may not have any other social tools or support systems. And now he has a lot of free time.

“It's potentially explosive,” said Block.

The computer use may be pathological, said Block, but it's stabilizing. “You have to be very patient and very careful when addressing the issue,” he said. “If you're too abrupt or too harsh in setting limits, you're liable to have far worse outcomes than if you'd never touched the issue in the first place.”

DSM

Block is particularly concerned about helping therapists avoid those wellintentioned but potentially disastrous interventions. But educating therapists about Internet Addiction will remain challenging so long as the disorder isn't recognized by the American Psychiatric Association.

The American Psychiatric Association regularly publishes a Diagnostic and Statistical Manual of Mental disorders—a handbook used by clinicians, researchers and insurance companies—and right now, Internet Addiction isn't in it.

"For many clinicians, the three, four, and five digit codes associated with each DSM-IV-TR disorder are the only components of the diagnostic system used on a daily basis," reads a website informing clinicians of the latest changes to the DSM. "These codes have direct relevance to the practical bottom line of clinical practice: no diagnostic code, no payment."

"I couldn't care less about insurance," admitted Block. "Almost all these patients have some DSM diagnosis. So, it's not a problem in terms of billing... I'd like to see a DSM diagnosis because then we'd have clinical criteria which we can test treatments against." If therapists had a standard definition of Internet Addiction, they could definitively study the population of addicts and find out what makes a person more susceptible to Internet Addiction. They could also work to find out how and if one type of treatment is most effective. As it stands today, researchers run the risk of comparing apples to oranges. Therapies that worked well on Kimberly Young's patients might not work as well on patients who were diagnosed with Internet Addiction according to another person's sensibilities.

If Internet Addiction isn't included in the upcoming version of the DSM—and most signs indicate that it won't be, despite a push from Kimberly Young, and the American Medical Association's suggestion of a category for pathological computer game use—the next opportunity to include it won't be come around for another decade and a half.

“I think we've embarked upon a huge experiment as a society, incorporating technology from very early ages, using it, teaching people how to use it, on every level we're incorporating it and yet we don't really understand...” said Block. “[Inclusion in] the DSM is just one step in that process of examining it but if we have to wait another twenty-five years to get our next major opportunity... that's a long time to be doing this experiment.”

“I believe technology moves us forward. Always.”

- Steve Wozniak, co-founder of Apple computers

It was a sunny October day in South Korea, and Jerald Block was a visiting lecturer, giving a talk on Internet Addiction. He'd heard of the Internet Cafes in the area and knew they represented hot spots of compulsive Internet use. Students could head for the cafe after school and spend all afternoon, all evening, or all night there for a fee. They have seats for two. You can take your girlfriend and game together. A few gamers have died from exhaustion in cafes like these, and he wanted to see them.

“They have about four per square block in the part of town that I was in,” he said. He walked into one of the cafes. It was half full of schoolchildren, on a beautiful Saturday.

"I'm a foreigner and kind of a big guy," Block said. "Usually someone would at least look up... But no. Even when I made my presence known and asked if I could take a photo ...no one even looked up. It was quite striking." Twenty people, teenagers all, in a row, staring at the screens with the same look on each face.

Internet Addiction, Block said, is more visible in Asian countries, where Internet Cafes make a public display of compulsive behavior. But it doesn't represent the phenomenon of one particular culture. Internet Addition is the expression of existing, personal pathology, and it would likely develop in any society that contained both the technology and people who wish to escape from bad social or psychological situations.

Ten years ago, reporters wrote that eating in front of a computer was a symptom of addiction. These days, it takes conscious effort to spend time away from the network. The boundaries of the Internet have stretched far beyond the computer. Wireless devices, like PDAs and blackberries, cellular phones and ultramobile laptops tap into the network no matter where you go. Modern city planning incorporates the need for "wireless spaces:" building parks and outdoor spaces for the use of the laptop and wireless Internet.

Rules of etiquette are shifting. We mult-task using digital tools to the extent where it's common to keep one eye on the real world, one eye on the virtual tickertape. It's hard to say where that trend will lead us next. There's a striking gap between the way that an addict uses the Internet and the way the average user does—a different psychological process. But in the most common cases of Internet Addiction, the disorder is defined by problems caused by the behavior. Will increased acceptance of excessive Internet use naturalize what might otherwise be considered pathological?

Would SW be considered an addict if he'd found a way to support himself by gaming professionally, competing in tournaments for a living? Would he have attempted suicide if society had recognized his in-game skills as economically viable? What if Josh took advantage of an online degree program, and fit in class between raid sessions, without having to leave the computer? What if he didn't feel like he'd be ridiculed for his game play? What if Scott's Aspergers patient decided he wanted to work from home and only wanted to socialize through the computer? Increasingly, online skill sets are being recognized for their value in the real world.

"There is this mythos," said Block. "Some of the concepts that have been introduced by science fiction, where people eventually start to live their entire lives through the computer at the expense of real life. And you know... maybe there's something to it. Maybe there is that risk, but we're not there yet."

"The concern I think, psychologically, is that if you become completely immersed and enamored in the secondary [virtual] world, then your primary life begins to waste away," said Scott, in a series she developed for YouTube. "You don't become the person that you could have been." She paused before going on quickly, "Perhaps. Perhaps it's arrogant of me to make the assumption that primary life is more important, ultimately, than second life. There will be people who disagree with me on that."

This generation values their virtual life more than members of any other generation still alive. Their Internet personas and online relationships are part of their identities, for a variety of reasons.

“We have a generation that's more or less housebound kids,” said Henry Jenkins, an expert on digital popular culture and professor of Comparative Media Studies at MIT. “They're latchkey kids whose parents aren't around... who have no place to go in their social life except online. All the activities that were part of boyhood and girlhood for previous generations have migrated online because it's the way that you can do something more interesting than staring at the four walls of your apartment. As we put more and more of those activities through the computer they'll spend more time at the computer.”

There are skills to be gained by living the virtual life. Jenkins has argued that the Internet engenders what he calls participatory culture—where the barriers to participation are lowered and creativity is encouraged.

But Scott worries that children who grow up online are missing some vital part of their childhood, and missing out on learning social skills in the real world. Will the users themselves view it that way? One of the qualities of this Internet Generation is that they have no personal memory of, or nostalgia for, a pre-Internet history. Maybe, for them, socializing and growing up online will naturally lead to a wired working life that appears impoverished to older generations, but satisfies the user. If that's the case, it wouldn't be Internet Addiction.

There's something disturbing in Block's description of a gaggle of children, motionless and rapt before computer screens on that perfect summer's day. But it may just be an old fashioned sensibility—the thought that children are supposed to run around, feel the sun, play outside. A better test of the scene would be to talk to them and ask the all-important questions: Does this make them happy? Are they functioning well in both their offline and online existence? Are they living the lives they want?

Interviews

Block, Jerald. M.D. Psychiatrist, practicing in Portland, Oregon. Interview conducted by phone. 2 January, 2008

Caplan, Scott. PhD. Associate Professor of Basic Course in the University of Deleware's Department of Communication. Interview conducted by phone. 4 January, 2008

Goldberg, Ivan. MD. Psychiatrist and Clinical Psychopharmacologist in New York City. Conducted by email. 29 November, 2007

Jenkins III, Henry. PhD. Co-Director of the MIT Comparative Media Studies, Professor of Literature and Comparative Media Studies at MIT. Conducted in person in 14N-205, MIT. 7 December, 2007

"Josh" ("Valanx") Player in World of Warcraft. Interview conducted in game via BarrensChat and over TeamSpeak© 3 December, 2007

"E" Member of "WowWidows" "EverQuestWidows" communities through Yahoo.com. Interview conducted in person. 12 December, 2007

"Nocture" Player in World of Warcraft. Interview conducted in game via BarrensChat. 3 December, 2007

Orzack, Maressa Hecht. PhD. Assistant Clinical Professor of Psychiatry at Harvard Medical School. Interview conducted by phone. 2 November, 2007

Schull, Natasha. PhD. Assistant Professor in the Program in Science, Technology and Society at MIT Conducted in person at E51-296D, MIT. 6 November, 2007

Scott, Pamela Shavaun. MFT. Psychoanalyst, Psychotherapist practicing in San Lois Obispo, California. Interview conducted by phone, subsequently by email. 1 January, 2008.

Turkle, Sherry. M.D. Professor in the Program in Science, Technology and Society at MIT. Interview conducted by email. 6 December, 2007

Yee, Nick. PhD. Research Scientist at the Palo Alto Research Center in Palo Alto, California. Creator of the Daedalus Project Online, a project that studies the psychology of MMORPGs. Interview conducted by phone. 28 December, 2007

Young, Kimberly S. PhD. Psychologist, founder of The Center for Internet Addiction Recovery Online. Interview conducted by email. 27 November, 2007.

References

2006 data products. in United States Census Bureau [database online]. 2007 [cited 5 May 2008 2008]. Available from http://www.census.gov/acs/www/UseData/2006GQ.html.

Diagnostic coding and DSM-TR-IV. in American Psychiatric Association [database online]. 2005 [cited 5 May 2008 2008]. Available from http://dsmivtr.org/coding.cfm.

Internet addiction. 1995. *The Plain Dealer Cleveland, OH*, 12 October 1995, 1995, sec 10E.

Sad souls in a drag-net. 1995. *South China Morning Post*, 14 May 1995, 1995.

Abbate, Janet. 2000. *Inventing the internet*The MIT Press.

Beard, Keith W., and Eve M. Wolf. 2001. Modification in the proposed diagnostic criteria for internet addiction. *CyberPsychology & Behavior* 4, (3): 377-83.

Belluck, Pam. 1996. Stuck on the web: Psychologists warn of a wave of internet addicts. *The New York Times*, 1 December 1996, 1996.

Block, Jerald. 2008. Issues for DSM-V: Internet addiction. *American Journal of Psychiatry* 165, (3): 306.

Block, Jerald. 2008. Homepage: Patient Education Resources. [Cited 5 May 2008] Available from http://www.jeraldjblock.medem.com/

Campbell, Andrew J., Steven R. Cumming, and Ian Hughes. 2006. Internet use by the socially fearful: Addiction or therapy? *Cyberpsychology & Behavior* 9, (1): 69.

Campbell, David, and Finer, Scott. The american internet user survey: Internet realities. new findings from the american internet user survey. Workshop on Internet Survey Methodology and Web Demographics, 1996 [cited 25 April 2008] Available from http://www.ai.mit.edu/projects/iiip/conferences/survey96/niceabs.html.

Case, Carl J., and Kimberly S. Young. 2002. Employee internet management: Current business practices and outcomes. *CyberPsychology & Behavior* 5, (4): 355-61.

Chuo, Ting-Jui, and Chih-Chen Ting. 2003. The role of flow experience in cyber-game addiction. *CyberPsychology & Behavior* 6, (6): 663.

Covert, Colin. 1995. As road, internet called dead end. *Star Tribune Newspaper of the Twin Cities Mpls- St. Paul* 01E, (15 April 1995).

Davis, Richard A., Gordon L. Flett, and Avi Besser. 2002. Validation of a new scale for measuring problematic internet use: Implications for pre-employment screening. *Cyberpsychology & Behavior* 5, (4): 331-45.

Ditlea, Steve. 1995. Report from the front: How to beat internet addiction. *Interactive Age* 12, (208) (13 February 1995).

Engleberg, Elisabeth, and Lennart Sjoberg. 2004. Internet use, social skills, and adjustment. *CyberPsychology & Behavior* 7, (1): 41.

Flavell, Dana. 1994. The canadian internet handbook by jim carroll and rich broadhead (review). *Toronto Star*, 6 March, 1994, 1994, sec Business.

Gray, Jennifer B., and Neal D. Gray. 2006. The web of internet dependency: Search results for the mental health professional. *International Journal of Mental Health Addiction* 4, : 307-18.

Greenfield, David N. 1999. *Virtual addiction: Sometimes new technology can create new problems.* American Psychiatric Association: The Center for Internet Studies at Pscyhological health Associates, .

Griffiths, Mark. 2000. Does internet and computer "addiction" exist? some case study evidence. *CyberPsychology & Behavior* 3, (2): 211-7.

———. 2000. Excessive internet use: Implications for sexual behavior. *CyberPsychology & Behavior* 3, (4): 537-52.

Grusser, S. M., R. Thalemann, and M. Griffiths. 2007. Excessive computer game playing: Evidence for addiction and aggression. *CyberPsychology & Behavior* 10, (2): 290-2.

Gussow, Dave. 1996. Can the net get you hooked?: Tech talk. *St. Petersburg Times*, 8 April 1996, 1996.

Harkness, David, and Lindstrom, Paul. The Nielson/CommerceNet survey: Methodology and results. [cited 25 April 2008 Available from http://www.ai.mit.edu/projects/iiip/conferences/survey96/nielsen/sld016.html.

Kendall, Hamilton. 1995. They log on but they can't log off. *Newsweek*, 18 December 1995, 1995.

Kerr, Bob. 1997. Beware the 'net: You might never come back from it. *The Providence Journal.*, 17 February 1997, 1997.

Khan, Mohamed K. 2006. *Report of the council on science and public health: Emotional and behavioral effects, including addictive potential, of video games.* American Medical Association, 12-A-07.

Kirkey, Sharon. 2008. Recognize internet addiction as a mental illness, MD urgers: Users experience cravings, withdrawal, psychiatrist says. *The Ottawa Citizen*, Monday, March 17, 2008, 2008.

Ko, Chih-Hung, Ju-Yu Yen, Cheng-Chung Chen, Sue-Huei Chen, and Cheng-Fang Yen. 2005. Proposed diagnostic criteria of internet addiction for adolescents. *The Journal of Nervous and Mental Disease* 193, (11): 728.

Leung, Louis. 2004. Net generation attributes and seductive properties of the internet as predictors of online activities and internet addiction. *CyberPsychology & Behavior* 7, (3): 333.

Lynd, Robert S., and Helen Merrell Lynd. 1959. *Middletown: A study in modern american culture*Harvest Books.

Madden, Mary43. Pew internet penetration and impact. in Pew Internet and American Life Project [database online]. 2006 [cited 5 May 2008 2008]. Available from http://www.pewinternet.org/PPF/r/182/report_display.asp.

McLean, Scott L., David A. Shultz, and Manfred Steger. 2002. *Social capital: Critical perspectives on community and "bowling alone"*NYU Press.

Meerkerk, Gert-Jan, Ven Den Eijden, Regina J.J.M., and Henk F. L. Garretsen. 2006. Predicting compulsive internet use: It's all about sex! *CyberPsychology & Behavior* 9, (1): 95.

Naughton, John. 1999. *A brief history of the future: The origins of the internet*. Great Britain: Weidenfeld & Nicolson.

Parks, Dan, and Deborah Locke. 1996. Growing obsession. *The Milwaukee Journal Sentinel* 1, (22 April 1996).

Platt, Wes. 1995. Entwined in internet addiction? *St. Petersburg Times*, 15 November 1995, 1995, sec City.

Putnam, Robert D. 2001. *Bowling alone: The collapse and revival of american community*Simon & Schuster.

Rau, Pei-Luen Patrick, Shu-Yun Peng, and Chin-Chow Yang. 2006. Time distortion for expert and novice online game players. *CyberPsychology & Behavior* 9, (4): 396.

Reid, T. R. 1984. Personal computers: How to turn your $3,000 computer into a $9.95 alarm clock. *The Washington Post*, 26 November 1984, 1984.

Sanchez, Rene. 1996. Students getting caught in the web. *The Las Vegas Review-Journal*, 26 May 1996, 1996.

Schrage, Michael. 1985. Personal computers: Two kinds of people. *The Washington Post*, 29 April 1985, 1985.

Scott, Shavaun. Gaming addiction? in http://www.youtube.com/watch?v=QoDLN6gGd_g&feature=related [database online]. 2007 [cited 5 May 2008 2008].

Shotton, Margaret. 1989. *Computer addiction?: A study of computer dependency.* Taylor & Franci.

Strassel, Kimberley. 1996. Caught in the web: This computer virus might ruin your life--doctors say internet addiction is not a laughing matter; housewives most at risk. *The*

Wall Street Journal (Europe), 20 May 1996, 1996.

The Associated Press. 2006. Parents sue game company over son's suicide. *The Age* (12 May 2006).

———. 1996. Survey taps internet addiction the average fix: 21 hours a week. *The Record*, 3 April 1996, 1996.

———. 1995. Some high tech fans find internet addictive. *The Providence Journal*, 23 July 1995, 1995.

Thompson, Iain. 2005. Game maker sued over child's death. *VNUnet.com*, 23 Nov 2005, 2005, sec Computer Games.

Thyken, Bob. 1995. Getting through life one baud at a time. *Interactive Age*, 13 February 1995, 1995, sec 14.

Turkle, Sherry. 2005. *The second self: Computers and the human spirit, twentieth anniversary edition*The MIT Press.

———. 1995. *Life on the screen: Identity in the age of the internet*. United States of America: Simon & Schuster.

Weiner, Norbert. 1965. *Cybernetics: Or the control and communication in the animal and the machine*. Second ed.The MIT Press.

Weizenbaum, Joseph. 1976. *Computer power and human reason: From judgment to calculation*. United States of America: W.H. Freeman and Company.

Whang, Lao Sang-Min, Sujin Lee, and Geunyoung Chang. 2003. Internet over-users's psychological profiles: A behavior sampling analysis on internet addiction. *CyberPsychology & Behavior* 6, (2): 143-50.

Wozinak, Steve, and Gina Smith. 2007. *iWoz: Computer geek to cult icon: How I invented the personal computer, co-founded apple, and had fun doing it*, ed. GinaW.W. Norton.

Wu, Chin-Shan, and Fei-Fei Cheng. 2007. Internet cafe addiction of taiwanese adolescents. *CyberPsychology & Behavior* 10, (2): 220.

Yee, Nick. 2006. Motivations for play in online games. *CyberPsychology & Behavior* 9, (6): 772-5.

Young, Kimberly S. 2007. Cognitive behavior therapy with internet addicts: Treatment outcomes and implications. *CyberPsychology & Behavior* 10, (5): 671-9.

———. 1998. *Caught in the net: How to recognize the signs of internet addiction--and a winning strategy for recovery.* Wiley.

———. 1996. *Internet addiction: The emergence of A new clinical disorder.* American Psychiatric Association, .

Young, Kimberly S., and Carl J. Case. 2004. Internet abuse in the workplace: New trends in risk management. *CyberPsychology & Behavior* 7, (1): 105-11.