

# Crossing the Chasm

**S**ITTING ALONE IN A DARK and dreary basement is a male creature bathed in a flickering bright light. Occasionally this strange beast emits a sound of defeat, screeching as if its life were ending. At other times, the creature lets out a cry of sheer joy, leaping up and down as if it had just conquered the world.

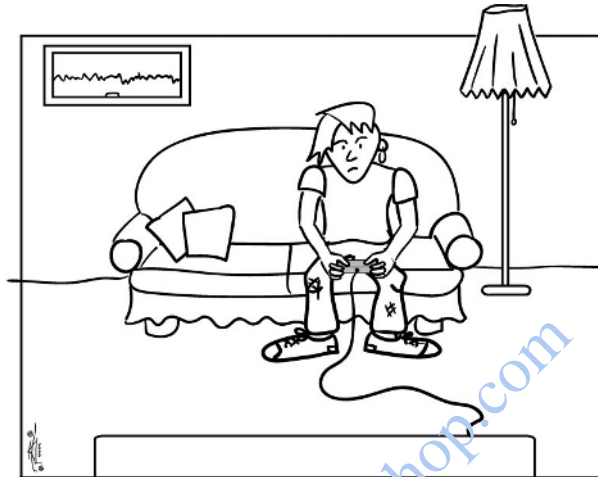
This is the somewhat skewed image most baby boomers (or boomers) have of someone who plays a lot of video games (Figure 1.1). It is the image of a lonely teenage boy sitting in his parents' basement hours on end and socializing with a game. He thrives on playing in an environment of extreme violence and debauchery. Parents, teachers, and other concerned citizens often mumble or even yell, "Video games rot brains! You'll never grow up to be anything if you play video games all day."

Nothing could be further from the truth.

A growing body of research has begun to reveal that video and computer games have tremendous educational value. It turns out that many of the traits,

**Figure 1.1.** A Boomer's Somewhat Skewed Image of a Typical Video Game Player.

Source: Reprinted with permission of the artist, Kristin Longenecker.



habits, beliefs, and actions that teenagers and young adults pick up playing electronic games and working with handheld gadgets will help them as they enter the ever-changing global workforce.

In fact, these very traits will forever alter the makeup of businesses, educational institutions, and government agencies. Boomers will be forced to adjust to the characteristics of the gamers, and gamers will need to learn the rules of the boomers. As this generational transition occurs, it is fraught with the usual strife between the work ethic and beliefs of the incoming generation and the institutions and parameters of the ruling generation.

And the timing couldn't be worse.

As gamers enter the workforce, boomers are leaving in droves and taking with them decades of knowledge, experience, and know-how. These independent, career-driven boomers have collectively transformed economies and driven productivity to unprecedented levels. They have lived through and shaped one of the most prosperous and dangerous times in history, and now they are leaving.

It is almost impossible to underestimate the knowledge gap that will be caused by the retirement of the boomers, a retirement wave that is already underway. In the next five years, approximately 40 percent of the skilled labor force will retire.<sup>1</sup> In the next ten years, the entire boomer generation will be over fifty years old.<sup>2</sup>

As the boomers leave and gamers enter, there needs to be an unprecedented transfer of knowledge, information, and data from one generation to the other. The transfer needs to be smooth and effective, or corporations, academic institutions, and government agencies will experience tremendous setbacks in productivity, profitability, quality, and even safety.

In his book *Lost Knowledge*, David DeLong tells a frightening story of a nuclear weapons designer retiring from the Los Alamos National Laboratory after thirty years of loyal service. Usually the retirement of one person is not that big of a deal. However, this retirement is of particular importance: the employee's exit leaves no one left in the lab who understands the design of missiles built between the 1950s and 1960s. "So what?" you might ask. "These missiles are no longer used, are they?"<sup>3</sup> In fact, they are deployed in military bases all over the world. The weapon designer's knowledge of nuclear missiles has to be transferred accurately and effectively to the next generation. Lives are at risk.

In a less dramatic example, one organization had to shut down its most successful production line for a month because a retiree left with key knowledge she didn't even know she possessed.<sup>4</sup> She was the only one who knew the proper method of placing a circuit board onto a customized soldering bench. Although the company thought to give her a gold watch as she retired, no one thought about the need to train a replacement. It was a simple job, after all; the new employee would just follow the written standard operating procedure (SOP) for circuit board placement.

Unfortunately, the SOP was wrong: the documentation had the placement of the board upside down. The retiree knew the SOP was wrong because she had discovered it years ago. And once she discovered the difference, she never used the SOP, and just placed the board in the correct position. She

didn't even think about it. Her replacement followed the SOP to the letter, and millions of dollars of circuit boards had to be scrapped. The retired employee solved the problem when the company, four weeks later, decided to call her back to see if she could solve the problem. It took her ten minutes.

## Where Is Everybody Going?

One of the biggest, most difficult issues facing organizations over the next ten years is knowledge transfer. In less hectic times, the knowledge transfer from the outgoing generation to the incoming generation took place slowly and at a pace easily digestible by organizations and institutions. This time the pace is blistering. Boomers are ready to retire now. Even if they don't fully retire from the workforce, they will be retiring from their current positions.

Muddying the water is the fact that the incoming gamers have grown up in a vastly different world than the boomers did. Gamers have different ideas about connectivity, reporting hierarchies, learning, and communication, all forged while playing games, manipulating gadgets, and surfing the Web.

Organizations that successfully transfer business acumen and hard-earned experiences to the incoming gamer generation will see tremendous leaps in productivity, quality, and profitability. Organizations that cannot transfer knowledge will experience dire results.

## Going, Going . . .

The numbers are staggering. There are between 64 and 77 million boomers, roughly 28 percent of the total U.S. population and 40 percent of the workforce.<sup>5</sup> The sheer size of the post-World War II boomer generation has shaped everything it has encountered.

In the 1950s and 1960s, when the number of children ages five to fourteen increased by more than 40 percent, the sales of potato chips skyrocketed. Auto sales rose as the boomers reached driving age. When the boomers move on, what they once embraced tends to languish like the Hula Hoop or the large number of primary schools built in the 1960s.<sup>6</sup>

Over the years, the boomers have “built up a tremendous amount of knowledge about how things work, how to get things done, and who to go to when problems arise. In some cases, this practical knowledge will be extremely hard to replace because it has been developed in an era of unprecedented technological and scientific advances.”<sup>7</sup> The knowledge is starting to walk out the door and will soon be sprinting toward the exits.

The leading edge of the boomer generation began turning sixty in January 2006. According to the Bureau of Labor Statistics approximately 35 million boomers will retire between 2000 and 2020 and another 23 million will retire during the following ten years.<sup>8</sup>

Boomers are ready to retire for a number of reasons: changing interests, a desire to make a difference, spending more time with the family, playing more golf, and concerns about their health. Although boomers claim that they want to rewrite retirement rules and stay employed until later in their sixties, research indicates that most will call it quits earlier than they think.<sup>9</sup> While nearly half of baby boomers expect to work past age sixty-five, only 13 percent of current retirees actually work until that age.<sup>10</sup>

Many retire because they see themselves as not healthy enough or feel too old to work.<sup>11</sup> As of 2005, only 60 percent of sixty year olds, 32 percent of sixty-five year olds, and 19 percent of seventy year olds were employed. The average retirement age in the United States is fifty-nine.<sup>12</sup> A survey of London accountants found that one in ten did not envision working past age fifty.<sup>13</sup> There is a strong possibility that boomers will not work for as long as they are predicting (or hoping).

Even if boomers do stay employed, chances are it will be in a new job. They will become independent consultants or switch to another line of work. Although 71 percent of workers ages forty-five to fifty-six plan to work into their retirement years, 35 percent of that group plan to work part time for interest or enjoyment, 11 percent expect to start their own business, and 7 percent plan to retire from their current jobs but work full time at something else.<sup>14</sup> So even if boomers do not leave the workplace en masse, they will most likely be leaving your organization, taking with them a vast amount

of knowledge and possibly costing your company dearly if you don't prepare now.

**Broad Impact.** No segment of the economy will escape unscathed. The U.S. Defense Department's civilian workforce of 675,000 is expected to lose 506,250 people by 2010. One-third of all secondary schoolteachers in the United States are expected to retire by that time as well. The oil and gas industry can expect to lose more than 60 percent of its employees by 2010, as will the aviation industry.<sup>15</sup>

In the automobile manufacturing sector, the estimated cost of retiring boomers is between \$50 and \$100 million.<sup>16</sup> This high cost reflects the expense of recruiting new employees, training those employees, and, most critical, lost productivity. The experienced boomers are taking a lot of know-how with them. According to Kim Hill of the Center for Automotive Research in Ann Arbor, Michigan, "The looming skilled labor shortage is the single most important issue the U.S. automobile industry will be facing in the next five to ten years."<sup>17</sup>

The manufacturing sector is in particularly bad shape; many manufacturing companies have eliminated their apprenticeship programs. Trade and vocational schools are mistakenly viewed as places to send troubled students. There have been well-publicized layoffs and plant closures. All of the signals are leading gamers to fear that manufacturing jobs are dead ends.<sup>18</sup> The manufacturing industry will not be able to transfer knowledge to new employees if new employees don't enter into the field. In fact, many old-economy jobs are not seen as desirable by the gamer generation, and the recruitment of gamers is going to be a hot issue in those fields.

While manufacturing seems to have it bad, other studies indicate it is not in the worst shape. Examine the energy, health care, and government sectors for the really alarming data.<sup>19</sup> Half the U.S. government's civilian workforce is eligible to retire within four years. With these types of retirements, there could be a labor shortage of over 5 million skilled workers between 2010 and 2012, because only 25 percent of U.S. companies surveyed indicated they were ready for such a mass exodus. A staggering 31 percent indicated that they have not even thought about the problem.<sup>20</sup>

**International Trend.** The problem is not confined to the United States. In Europe, the pool of workers ages thirty-four to forty-four is expected to shrink by 19 percent in the United Kingdom, 27 percent in Germany, and 9 percent in Italy.<sup>21</sup> The Ford Motor Company expects the number of workers older than fifty years old to double in its European plants by 2010.<sup>22</sup> Across Europe, baby boomers are already starting to retire, although the first of the European boomers won't reach age sixty-five until 2011. Many of Europe's state-funded pension systems encourage early retirement. Currently, 85.5 percent of adults in France quit work by age sixty, and only 1.3 percent work beyond sixty-five. In Italy, 62 percent of adults call it quits by age fifty-five.<sup>23</sup>

In Japan, the number of people between ages fifteen and sixty-four is expected to decline an average of 740,000 a year for the next ten years; already seventeen out of every one hundred people are over age sixty-five, and this ratio will become thirty out of a hundred in fifteen years.<sup>24</sup> Japan's large neighbor, China, will have over 265 million sixty-five year olds by 2020.<sup>25</sup>

## Traits of Boomers

The workplace the boomers are leaving behind is one of their own creation. Although boomers are retiring, they are still very much in control of many institutions, from for-profit companies, to academic institutions, to political leadership. The events and the social setting in which the boomers grew up influences how they act, interact, and react to social and professional situations. Boomers have been classified as having the following characteristics:<sup>26</sup>

- Individualistic
- Driven
- Loyal
- Idealistic
- Skeptical

## Individualistic

Boomers value independence and work hard to do their own thing. The skeptics call them the “Me” generation because of the intense focus boomers have on themselves and their own wants and needs. Boomers pioneered the concept of customized products and services. They stand in line waiting to order a grande double espresso with a shot of caramel syrup or one of the other staggering number of coffee options available at Starbucks. Boomers have driven food companies to offer more and more specialized items. Arby’s sold only one kind of roast beef sandwich when it was founded in 1964. It now sells thirty different sandwiches. Dryer’s Grand Ice Cream offered 34 flavors in 1977; now it offers over 250.<sup>27</sup> The boomers want to do their own thing, even if it means scrapping some of the institutions of their parents. In fact, nearly 50 percent of all U.S. marriages now end in divorce partly as a result of the desire of boomers to “go their own way.”<sup>28</sup>

## Driven

The drive of this generation is evident in their early commitment to social causes and their later commitment to work and fulfilling their own dreams. This generation invented the term *workaholic*. To boomers, work and life become intertwined in a drive for that elusive sense of success. They applaud the achievement of individuals and strive for the recognition and trappings that come from obtaining success. This generation created the concept of quality time, meaning that if you spend a little bit of high-value time with your kids, it is the equivalent of spending a lot of “regular” time with them. In this generation, both parents tend to work. Boomers take their intense drive and work ethic with them into profit-driven activities as well as leisure pursuits.

## Loyal

Boomers are loyal. Their loyalty to brand names like Coca-Cola, Harley Davidson, and Disney is legendary. Boomers have been known to tattoo logos of these brands on their bodies. They have intense loyalty to the past and to such rock groups as the Rolling Stones who have been touring for decades. Some



pundits see this as a refusal to grow old, while others see the loyalty to corporations and to each other as a positive trait. They respect face-to-face meetings and build loyalty through physically meeting with others and establishing face time with peers. Boomers work well in a team setting controlled by an outside authority like a manager or a boss. They respect and are loyal to their work and social teams. They hang together in times of strife and pressure.

## Idealistic

Although not every boomer was at Woodstock, lived in a commune, or participated in a college sit-in, they do generally have a tendency toward idealism and spirituality. They have a certain expectation of how society and organizations should function. This generation saw leaders like Martin Luther King Jr. make a difference and organizations like the Peace Corps come to life. They witnessed the United States putting a man on the moon. Boomers marched for civil rights and launched the feminist and gay rights movements. They believe in crusades, ideals, and working tirelessly to see those ideals come to fruition. The group Mothers Against Drunk Driving (MADD) was founded by a boomer in the 1980s.

## Skeptical

But this generation also witnessed the shooting of President John F. Kennedy, the assassination of Martin Luther King Jr., and the shooting of Robert Kennedy on television. This is the same generation that followed the Grateful Dead, flaunted rock and roll in the face of their parents, shouted the phrase, “Don’t trust anyone over thirty,” protested every type of institution from universities to the government, and then graduated from college and went to work for J. P. Morgan, Arthur Andersen, and Coopers & Lybrand—some of the stodgiest institutions in the country.

Decades later, the founder of MADD disagrees with the direction of the organization and has become a lobbyist for the American Beverage Institute.<sup>29</sup> According to its Web site, the institute is dedicated to the protection of “responsible on-premise consumption of adult beverages” (read “promotes drinking”).<sup>30</sup>

Boomers witnessed the Vietnam War on television and watched Richard Nixon lie about Watergate. They have been victims of the largest layoffs in history. They have seen ten, twenty, even twenty-five years of service ignored in the search for bigger corporate profits. It's no wonder boomers are skeptical of authority. Paradoxically these skeptical boomers are also now the authority. This dual sentiment is adeptly expressed in a television commercial for the telecommunications company Sprint. In the commercial flaunting the virtue of a wireless calling plan, a somewhat melancholy boomer is telling his underling how he is avoiding paying for unwanted minutes through his new calling plan.

He says, "I can talk when and how I want, it's my little way of . . . sticking it to the man."

The younger man looks at him quizzically and says, "But you *are* the man."

"I know," the boomer replies.

"So you're . . . sticking it to yourself?"

"Maybe?"<sup>31</sup>

## Boomer Workplace Ethos

Boomer mentality and traits have dominated the corporate landscape. For one, the drive toward individualism tied the boomers' identities to their work. They defined their job, and their job defined them. They did more with less while simultaneously attempting to have it all. Failure was never an option. Climbing the corporate ladder was an honorable endeavor. They wanted the benefits of a career and the peaceful family life of their parents. Remember the woman from the Enjoli perfume commercial with a baby and briefcase in one hand and a frying pan in the other? She could "bring home the bacon, fry it up in the pan," and still be romantic when her husband arrived home from work. She was a boomer.

The boomer work ethic was based on the need to be successful coupled with the desire to buy more and more material goods, which were being created in increasingly large numbers. Boomers believed working hard should have its rewards. When they wanted something, they wanted it now. The

credit card industry soared as the boomers grew up and embraced the concept of buy now, pay later.

Having a career meant making a commitment to an employer. Whatever effort was needed to get the job done, the boomers would do it—staying after 5:00 P.M. or making a personal sacrifice. If it was perceived as good for the boomer and their employer, they made it happen. Consequently, boomers worked longer hours than their parents—sometimes sixty or seventy, or even eighty, hours a week. Personal needs were often put aside in an attempt to be loyal to the company and achieve results.

Boomers needed to be seen at work. Advancement was earned by putting in plenty of face time with the boss. The processes of doing the work and being seen at the physical place of employment were important. Telecommuting never really took off with the boomers because they needed to be seen. Out of sight equaled out of mind.

Chances are that every boomer has struggled with some type of new technology while working on a project. Boomers faced emerging technologies at every turn in their careers: desktop computers, fax machines, cell phones, and the Internet. They witnessed the space race and the transition from black and white to color to high-definition television. This was especially tough for boomers, because their formative educational experiences were devoid of technology. They did not have computers in the classroom or even calculators in many cases. Even their first years on the job did not involve much technology. It wasn't until late in their careers that computers began to dominate the workplace. As management maven Tom Peters observes, "The modern computer has been with us for more than half a century. But it was arguably a member of the supporting cast, not a prime determinant of enterprise strategy, until the early- or mid-1990s."<sup>32</sup>

The boomers are digital immigrants.<sup>33</sup> They have had to work hard to learn to live with technology and its associated array of gadgets.<sup>34</sup> Although boomers have adapted to the technology, it is still not something they are 100 percent comfortable with. Many fondly look back to a time when there was no information overload and technology didn't change every year.

To help control their for-profit and nonprofit organizations, boomers adopted a team-based command-and-control structure. They wanted teams to accomplish tasks, but the team reported to one manager or boss in a traditional hierarchical structure. Divisions and departments would work with each other, but cross-functional teams were slow to come about. Functional silos were developed, and areas within the company would often do well individually, though at the expense of the entire company. For example, a purchasing department in a large manufacturing company buys lots of raw materials because of a good deal from a vendor. This large amount of inventory drives up costs for the material control department, which is then blamed for having too much inventory, and the production department grumbles because they have to work around the excess inventory. However, at the end of the day, the purchasing department is rewarded for keeping purchasing costs low.

Departments do not cooperate with each other. To solve any problem, the employees inform their manager, who in turn takes the matter up with the manager of the other department. The process is slow and inefficient, but proper reporting lines must be followed or heads roll.

This generation built elaborate hierarchical structures and corporate ladders that clearly indicated who reported to whom within the organization. Reporting and promotional paths were clear. If you spent enough time with a particular organization, kept your nose clean, and did good work, you would naturally move up the corporate ladder. These hierarchies were effective for many years until disruptive technologies and globalization made them too slow and unresponsive to react to the changing marketplace.

Unfortunately, many companies run by boomers were slow to respond, and boomers who had worked faithfully for one employer for years found themselves suddenly out of work. This reinforced the skepticism of the boomers and rocked their perception of who they were. Even if they personally didn't live through a layoff, they inevitably had friends who did.

This has caused a number of boomers to exit the "rat race" and seek volunteer work or to start their own companies. The idealism that once defined the generation is drawing boomers toward more socially conscious endeavors as they begin to exit the workplace and seek calmer lives.

## Defining a Gamer: Four Levels

Waiting in the wings for the big boomer retirement are about 90 million people who are part of the gamer generation.<sup>35</sup> The leading edge of this generation began playing video games in earnest in the early 1980s at the same time as the emergence of the video game *Pac-Man*. It is no coincidence.

A short time later, Tim Berners-Lee took the Internet (a network of computers that could transfer files but had no graphics or hyperlinks) to the next level. His creations enabled the World Wide Web complete with hyperlinks and graphics. MS Windows was born in the 1980s, bringing with it a widespread acceptance of a graphical user interface and a thing called a “mouse.” People now had access to computer games.

On the video game front, the Atari 2600, Mattel’s Intellivision, and Coleco’s ColecoVision game consoles were introduced. Anyone with a television could now play arcade-style games. While it may have taken the modern computer over a half a century before it began to have an impact on organizations’ strategic thinking, the influence of video games was already affecting the workplace. The convergence of these technological events is shaping the gamers and introducing them to skills and behaviors unlike those of any previous generation.

### Definition of *Video Game*

The term *video game* is used in this book to encompass all types of electronic games—games with screens. The definition of *video game* includes handheld games like the PSP and the seemingly ubiquitous GameBoy series. It includes what are known as console games, which are better known by the major brand names of Xbox, PlayStation, and Nintendo. The definition covers PC games and games that can be played on the Internet. Most games can be played across the various platforms, and the primary traits that gamers learn while playing on the different types of game interfaces are similar. So for the sake of readability, unless needed for clarification, the term *video game* will be used to describe any of the game delivery platforms.

## Ready or Not . . . Here They Come

A *gamer* is someone who has grown up in the generation influenced and shaped by video games and technology. Those who have grown up during the time when many people within their generation were playing video games are gamers. Even if the person did not own a console or a PC on which to play games, chances are he or she played the video games at a friend's house, at the arcade, or even at school.

This broad definition is not based on whether the person is currently playing video games. Many kids have grown up playing video games and then moved on to other pursuits as they got older (although many have not; a typical gamer is about thirty years old). Kids who played video games during their formative years or were involved in the popular culture that hyped and discussed the attributes of video games have been shaped by video games, whether they know it or not.

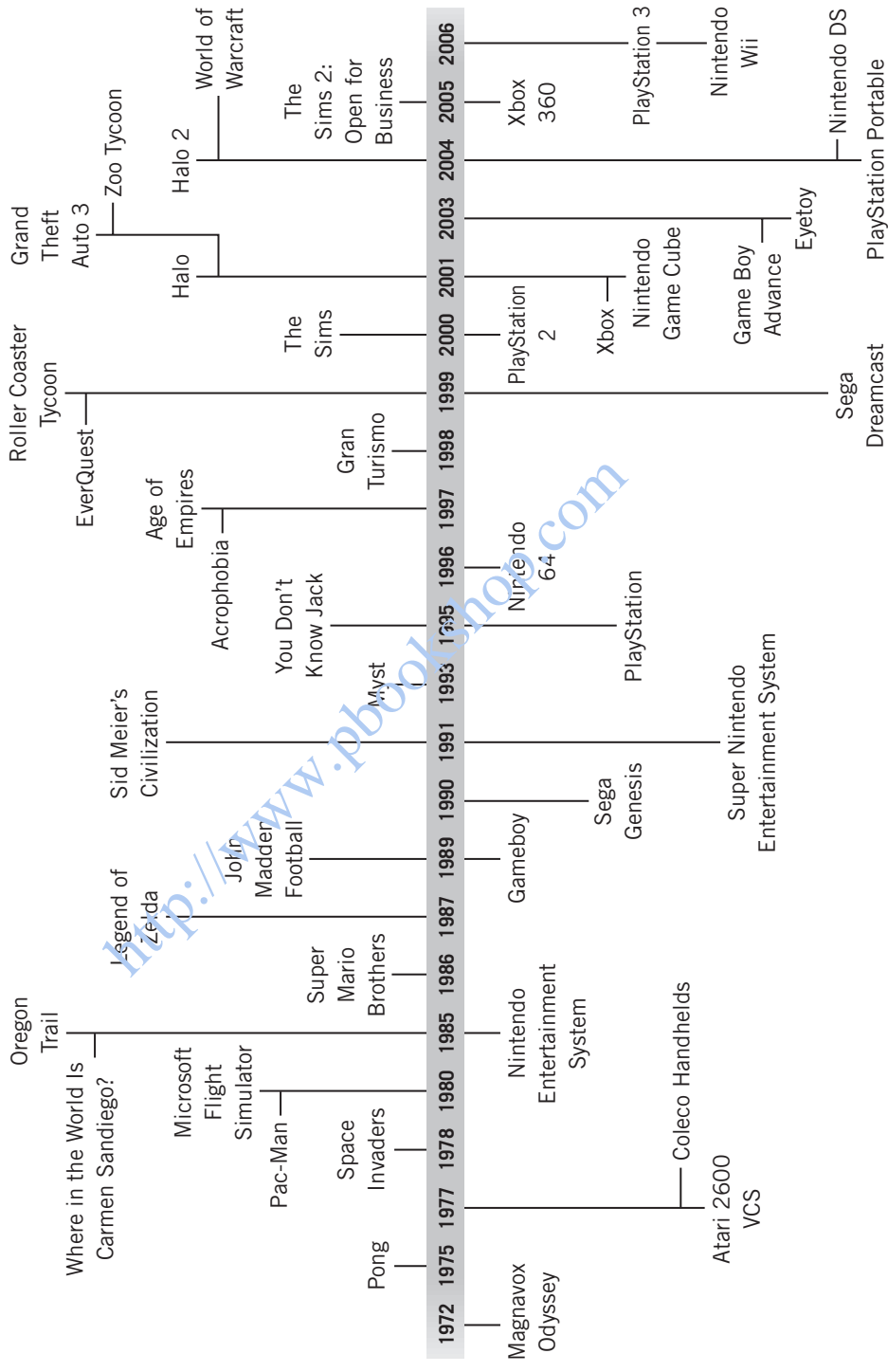
In much the same way, baby boomers were shaped by the culture of television even if every boomer did not have a television at home. For the boomers, cultural references, opinions of leaders, and the influence of others were shaped by the introduction and widespread adoption of television. The same is true of the gamers, who were shaped by video games.

As video games evolved, they placed different demands on the players and began to have differing levels of influence on the cognitive processing of those players. The level of complexity, realism, and cognitive engagement of video games has changed dramatically over the past few decades (Figure 1.2). Kids playing video games in the early 1980s played considerably different games from kids in the year 2007. The influence of games on learning style, expectations, and business acumen is just now becoming visible. As today's gamers start to enter the workforce, the differences will be even more profound and accelerated.

Looking at the evolution of games and gamers, there is a breakdown of four distinct categories. The categories are based on birth year and what games were available when the person hit his or her prime gaming years, which start at about age ten, although that age seems to be dropping (Table 1.1).

**Figure 1.2.** Game and Console Evolution Chart.

Source: Author.



**Table 1.1.** Levels of Gamers.

	<b>Gamer 1.0</b>	<b>Gamer 2.0</b>	<b>Gamer 3.0</b>	<b>Gamer 4.0</b>
Birth Years	1960–1970	1971–1980	1981–1990	1991–2000
Gaming Years	1970–1980	1981–1990	1991–2000	2001–2010
Defining games	<i>Pong</i>	<i>Pac-Man, Space Invaders, Battlezone, Super Mario Brothers, Tetris</i>	<i>Myst, Zelda, Manic Mansion, The Secret of Monkey Island, Tomb Raider, Diablo, EverQuest, Super Mario 64</i>	<i>SimCity, The Sims, Halo, World of Warcraft, America's Army, Grand Theft Auto 3</i>
Level of interactivity	Extremely low	Low	Moderate	Immersive
Degree of realism	Extremely low	Very low	Low to moderate	High to extremely high
Degree of cognitive processing	Low	Low	Moderate	High
Thought process	How do I hit this ball to return it to the other player? Can I bounce the ball off the wall to fool my opponent? What pattern do I need to memorize?	Do I move to the right or the left? How do I avoid or jump over that obstacle? Can I jump up to that platform? How can I jump to the platform? What changes to the pattern will I encounter at this level?	Where do I look to find the hidden pieces? What do I need to complete my quest? Should I talk to that person? What visual clues have I encountered? How can I relate the items I am collecting to the goals I am trying to accomplish?	What variables do I need to balance to ensure that I keep my people happy? Can I find someone to trade the items I have for a more valuable item? What would be a fair trade? What is the trade-off between these three choices? What strategy is the most effective for this type of



**Table 1.1.** Levels of Gamers (*continued*).

	Gamer 1.0	Gamer 2.0	Gamer 3.0	Gamer 4.0
				situation? How can I get a team together to defeat this boss?
Player collaboration level	None	Low	Minimal	High

**Gamer 1.0.** This was the first segment of the gamer generation: to experience video games, and their experience was limited in scope. They were born between 1960 and 1970 and overlap the tail end of the boomer generation. At about age ten, in the 1970s and early 1980s, these kids started playing basic electronic games, which were mostly limited to *Pong* and arcade games. One video game system available in 1972 was the Magnavox Odyssey. It included overlays that had to be placed on the television screen to help with the aesthetics of the various games because the electronic graphics were so crude.

The level of interactivity and realism in these games was extremely low. The player didn't need to do much cognitive processing (thinking) to play the games successfully. Players could not collaborate with each other through the game. The only collaboration they had was to shout instructions to each other across the room. Most games were single player or, if they were multiple players, were limited to two players working against each other.

The process of playing these types of games started to change the mindset of these individuals in a subtle way. They learned to look for and respond to predictable patterns that presented themselves in the game. They also learned that entertainment could be actively consumed versus passively received, as it was with television. Still, these early games were considered just another pastime. Parents viewed and could understand these games. They didn't always understand the appeal, but they knew what was happening.

**Gamer 2.0.** Gamers 2.0 are kids born between 1971 and 1980, whose primary game-playing years were from the 1980s to the 1990s. When they hit the primary gaming age, they were playing *Pac-Man*, *Gauntlet*, and *Dragon's Lair* in the arcades; *Space Invaders*, *Combat*, and *Breakout* at home on the Atari 2600 VCS; and *Oregon Trail* and *Where in the World Is Carmen Sandiego?* at school.

These were the first kids to experience *Super Mario Brothers*, which forged a path many other games followed. These games had improved graphics from the days of *Pong* but were still two-dimensional and cartoonish. Players did need to think a little more as they worked their way through the world of Mario, but it was mostly jumping over obstacles or figuring out how to defeat a boss at the end of a level. Most of the games of the time were not free form but were hard-wired and followed precise patterns. Some *Pac-Man* masters knew the patterns so well they could defeat the game without looking at the screen.

To combat this practiced ability to anticipate the predictable patterns and keep gamers playing, game developers added multiple levels to games and created the goal of beating the entire game instead of just obtaining the high score. Players had to think about patterns and predict what to do next, and then apply some of that learned knowledge to the next level. Each level built on the learning of the previous level and then expanded what the player needed to learn.

In schools, Gamers 2.0 were also challenged with *Oregon Trail*, an educational adventure game with text-based messages and instructions that forced players to think through various problems to devise a solution. Even if a Gamer 2.0 never played *Oregon Trail*, the influence of the game was huge. Many other similar games were developed to try to capitalize on the fact that learning and fun could be combined together in the form of a video game. After *Oregon Trail*, the link between video games and learning became clear. It also became a goal of many future game developers, educators, and corporate trainers.

On the entertainment front, these Gamers 2.0 were confronted for the first time with a game that was more exploratory or discovery based, *The Legend of Zelda*. In this two-dimensional game, the player assumed the role of Link, a blonde-haired hero who had to find the eight lost pieces of the Triforce of

Wisdom and save the princess. This game was different from its predecessors: whereas most previous video games were one-shot experiences, offering no continuity from one gaming session to the next, *The Legend of Zelda* introduced a backup system to record player progress. When it came time to keep playing your quest, you simply selected the correct file and continued.<sup>36</sup>

Shigeru Miyamoto, the creator of *The Legend of Zelda* and *Donkey Kong* and other famous Nintendo games, stated that the first *Legend* was created to allow players to explore freely; he wanted to make a game where the player becomes more creative by playing the game. He has been quoted as saying, “I tried to make a game where the next move the player is supposed to take is not already determined. Each player has to decide the route he or she thinks is best and take the best possible action . . . players themselves can grow.”<sup>37</sup>

This era also include the introduction of the famous puzzle game *Tetris*, which had a massive appeal to both male and female players. It involved trying to position geometrical shapes in the right place to complete a solid row of blocks. Once the row was complete, it would disappear. The object was to not let the blocks reach the top of the screen.

*Gauntlet* hit the arcades in 1985. This multiplayer role-play game allowed up to four players to keep playing as long as they kept depositing quarters in the game. The game was so popular that in some arcades, operators limited the number of coins a player could play at one time.<sup>38</sup>

These types of games began having an impact on players’ thinking processes outside the gaming environment, especially with some of the problem solving that was required. The Gamer 2.0 grew up expecting instant feedback and to be the hero. These traits were beginning to be learned, but the unrealistic nature of the games and the lack of immersion didn’t provide a tremendous difference between those who played these types of games frequently and those who did not. In addition, video games were still in their infancy and were not as widely available as they would soon become.

These games were now a little more complicated than hitting a digital ball or shooting digital aliens. It was becoming more difficult for a casual observer to walk by the television or PC and figure out what was going on. Parents really needed to sit down and watch the game to figure it out.

**Gamer 3.0.** This is the first group that had a chance to play in worlds approximating three dimensions and providing an increased degree of realism. Gamers 3.0 were born between 1981 and 1990 and played games in their formative years from 1991 to 2000. Anyone who has ever played video or nonvideo games was always able to get lost or immersed in a game (think of how immersive an intense poker or chess game can be). The addition of realistic graphics to the video gaming world added a visual dimension that transported players to another world in a way that was not previously possible.

Gamers 3.0 were introduced to the highly interactive adventure game *Myst*, where they entered a mysterious world of linking books and had to solve puzzles and find clues to determine the outcome of the game—all from the first-person perspective. The player didn't watch a character move through the game world; he or she actually moved through the game world and saw the world as if there. The *Myst* Web site describes the experience: players “journey to an island world surrealistically tinged with mystery. Only your wits and imagination will serve to stay the course and unlock the ancient betrayal of ages past.”<sup>39</sup>

Gamers 3.0 had more realism than 1.0 or 2.0 Gamers: they had increased adventures, more difficult challenges, and a deeper level of involvement with the video games. This was mainly due to the release of more powerful game consoles. The PlayStation and the Nintendo 64 were both introduced during this time frame with improved, realistic graphics. One game that took full advantage of the Nintendo 64 platform was *Super Mario 64*, which provided a rich three-dimensional world.

Players could embark on a pirate adventure with the game *Secret of Monkey Island*. They could work together in *Madden Football*, which released a new version practically every year, or join forces with friends online in *Diablo*, an online role-play game that had a multiplayer mode, allowing up to four people to work together to fight creatures or trade goods. The online play was enabled by a system called Battle.net, an online service started in 1997 by Blizzard Entertainment as a way of allowing players to interact with each other over the Internet. In 1999, *EverQuest*, a three-dimensional fantasy massively multiplayer online role-play game (MMORPG) game was released. It went on to become one of the most popular MMORPGs ever.

Players who didn't want to collaborate with friends could battle them to the death in *Mortal Combat* and score extra points by finishing them off with a fatality, an extremely graphic killing of an opponent after defeating them. It involved tearing or ripping off a part of the opponent's body. *Mortal Combat* was one of the first games with digitized motion-captured graphics, a feature that raised the bar on future graphic expectations.

Games like *Doom*, *Tomb Raider*, *Resident Evil*, and *Metal Gear Solid* ushered in the era of cinematic flair for video games. Cinematic camera angles were used to increase suspense and drama. These games included a new level of exploration, allowing players to have more freedom than ever before within the game world.

The impact outside the gaming environment was huge. Kids were learning that they could have rich, interactive experiences while playing games. They could get lost in a realistic world and be a hero in their own adventures. They could collaborate with each other to achieve success and define how they interacted within the world of the game.

Parents needed to sit down and play these games to understand what was happening. It was not possible to observe the game and grasp it.

**Gamer 4.0.** This group hasn't yet entered the workforce, but when they do, they'll have a huge impact. These are the kids flooding the schools and causing all types of problems. They find it hard to sit still in lectures when they are used to instant feedback and constant stimulation. These kids, born between 1991 and 2000, are just now moving toward the end of their formative gaming years. They have been gods, ruling the lives of simulated beings in *The Sims 2*, they have been the first-person hero in dozens of *Halo* and *Halo 2* levels, they have mastered city planning in *SimCity*, and they have played as Scooby-Doo, Jimmy Neutron, and other cartoon characters on game consoles, handheld games, and the Internet at [www.cartoonnetwork.com](http://www.cartoonnetwork.com). And before that, they played as Blue or Dora the Explorer on [www.nickjr.com](http://www.nickjr.com).

These kids have their own cell phones, personal digital assistants, and laptop computers. They play games that are deeply involved and collaborate online in MMORPGs, such as *World of Warcraft*, *Runescape*, and *America's Army*. They have their own online economies, trade for goods, and strategize

in business and commerce. These kids experience the open-ended sandbox game play of *Grand Theft Auto 3*, a game that, if you can look past the violence, allows an unprecedented freedom to go anywhere at any time. It has a completely nonlinear format where players can literally play the game any way they want. These are the serious gamers.

### Online Trading

*Runescape* is an MMORPG. It is like a huge online world where you interact with other players doing trades, talking, or helping each other with quests. You can level up your character in many different ways. One of the ways you can level up is in woodcutting skill. Leveling up helps you get more abilities: the higher the woodcutting skill, the more trees you can cut. For example, if your woodcutting level is 30, you can cut willows. But if your woodcutting level is only 15, then you can cut only oak trees.

One day I was making a deal with a person named Dungmonkey38: he said if I cut him fifteen thousand willows, I could get Full Rune, which is really good armor. I thought that fifteen thousand was a lot, but then I thought that I could pay other people to get them for me. I accepted the offer and went ahead and paid another kid to cut the willows for me. When the other kid had all of them cut, I told Dungmonkey38. He said to give him the willows, so I did. In the end I got my armor, and he got his willows. If u wanna play runescape u can get on. Go to runescape.com. Then b my minion and do my dirty work. Muahahaha-hahahahahahhahahah.

Nathan Kapp is an avid *Runescape* fan and a Gamer 4.0 who surfs the Internet daily, makes online purchases, uses instant messaging with wild abandon, and owns a cell phone and a laptop computer. He is looking forward to turning thirteen and entering the seventh grade.

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Source: Printed with the permission of Nathan Kapp.

The degree of realism in these games is striking. Moms and dads walk by their kids playing *Madden Football 2007* and ask, “Who’s winning?” It looks

so real they think it is an actual game. A Gamer 4.0 controls the look, uniform, build, talent, and “coolness” of his or her own football player. The player can go through a draft after passing an “IQ test” and can then demand to be traded to another team if he or she doesn’t like the drafting team. Not only is the realism striking, but the interactivity is as well.

As Satoru Iwata, president of Nintendo, stated in a keynote address at a games conference, “Books, movies, and TV shows are exactly the same for every user. But our games let players help write their own screenplays and their own endings.”<sup>40</sup> Gamers 4.0 are writing their own stories and endings over and over again.

For Gamers 4.0, growing up creating their own endings and screenplays in video games has changed all the rules. They have had to process new, realistic worlds and learn strategies and basic business concepts while running theme parks or zoos or exploring new online worlds. They have received instant feedback and hundreds of chances to try something until they get it right. They collaborate online with friends and strangers from all over the world to achieve desired goals. Gamers 4.0 are competitive, techno-savvy, confident, and ready to prove what they know.

Not only have they grown up on games, they have grown up with the Internet. In fact, 84 percent of people under the age of twenty-nine access the Internet on a regular basis.<sup>41</sup> The numbers get larger the younger you go. The U.S. Commerce Department found that 90 percent of children between the ages of five and seventeen use the Internet: 90 percent of 47 million children.<sup>42</sup> Many use the Internet for e-mail, chats, and games. In fact, over a third of all Internet users report using the Web to engage in games.<sup>43</sup>

Kids eight to ten years old play video games for about one hour every day. Male teenagers currently play about thirteen hours of console video games a week.<sup>44</sup> Their female counterparts play fewer console games (five hours a week) but make up the majority of PC gamers, at 63 percent.<sup>45</sup> According to the MediaWise Video Game Report card, 87 percent of eight- to seventeen-year-old children play video games at home. More than nine out of ten boys (92 percent) play video games at home, and 80 percent of girls say they play.<sup>46</sup> By the time a student graduates from college, he or she will have played over ten thousand hours of computerized games.<sup>47</sup>

**You Go Girl.** It is not just males who are Gamers 1.0–4.0, females are as well. Although their involvement tends to go unnoticed—even among themselves. As Kirsten Kearney, a video game industry journalist, puts it, “I started off playing *Pong* twenty-five years ago, then I had a GameBoy and played *Super Mario*. There are plenty of girls who did this, but when you ask if they are gamers they say no.” Nikki Douglas, founder of [www.grrlgamer.com](http://www.grrlgamer.com), a site dedicated to girl gamers, adds, “We know that women do play games . . . we have played hundreds upon hundreds of [video] games.”<sup>48</sup>

While not as visible as their male counterparts, females are no strangers to the video game world. Seventy percent of the players of the social interaction game *The Sims* are women under twenty-five.<sup>49</sup> The computer game that held the number one position in the Children’s PC chart from May 2004 until July 2006 was designed specifically for girls ages six to eleven.<sup>50</sup> In that popular game, *Princess Fashion Boutique*, a player chooses her favorite fairy-tale princess and dresses the princess in a variety of outfits mixing and matching colors and textures until everything is just right.

A game that has been a hit with older females is Nintendo’s *Nintendogs*. This game allows players to “pick out a puppy, name it, and then watch it interact with other dogs.” Forty-two percent of *Nintendogs* purchasers are women, with over seven hundred thousand copies of the game sold over the first two months in Japan.<sup>51</sup> When the game hit the United States, it sold two hundred fifty thousand copies the first week and sold out of two major computer game store chains within a month.<sup>52</sup>

Increasingly, females are playing first person shooter games as well. In fact, there are several female-only game tournaments started by women for women. Web sites such as [www.womengamers.com](http://www.womengamers.com), [www.ladygamers.com](http://www.ladygamers.com), [www.grrlgamer.com](http://www.grrlgamer.com), and [www.gamegirlz.com](http://www.gamegirlz.com) have sprung up to eliminate the stereotype of girls not playing video games.

Females are active participants in video games; they are learning the same traits, concepts, and behaviors as their male counterparts when it comes to the influence of video games. While females tend to gravitate toward different types of games, the lessons learned—problem-solving, the benefits of exploration, and the advantages of multiple attempts—are all the same.



Gamer traits are cross-gender traits, because young girls play video games and are growing up in a culture influenced by those games.

## The Allure and Power of Games

It is obvious that games are immensely popular. What is less obvious is that they are also powerful teachers that have been schooling a generation of gamers for the past thirty years.

Learning is most effective when the learner has an achievable, well-defined goal. With a goal, you are “willing to be corrected for your mistakes and accept ‘try this, do that’ advice in order to achieve your success.”<sup>53</sup> Games are filled with goals: reach the final level, raise the puppy into a dog, defeat this creature, find the treasure, save the princess, dress appropriately for the royal ball, beat your previous time, defeat the computer opponent, defeat your human opponent. Games induce players to create their own worlds, participate in social activities, form effective teams, reason, and save lives.<sup>54</sup>

Gaming puts the player in control, gives clear, immediate feedback on progress, and offers progressively more challenging levels of achievement that a player reaches at his or her own pace. There are few other environments that offer that level of feedback or critique. Games require observation, rapid and continual choices, thoughtful strategic planning, good eye-hand coordination, and fast physical reflexes.

Contrast that gaming environment with the typical classroom environment that dominated the education of the boomers. In the classroom, the instructor was in control, gave sketchy, infrequent feedback, and expected the entire group of learners to progress at the same rate.<sup>55</sup> There is no contest: gaming wins.

Daphne Bavelier, a researcher who conducted studies with funding from the National Institutes of Health and the James S. McDonnell-Pew Foundation in the area of video games, made the following statement about her research: “Our findings are surprising because they show that the learning induced by video game playing occurs quite fast and generalizes outside the gaming experience.”<sup>56</sup> She goes on to say that whatever it is that gamers learn transfers to other situations.<sup>57</sup>

Bavelier is not alone in her research or findings. There is a growing body of research concentrating on the ability of the brain to change in response to stimuli and behaviors that require intense stimulation, such as video game playing. It seems that teenage brains are open to lasting physical changes: “In the late 1990s, neuroscientists discovered that the adolescent brain . . . undergoes a wave of exuberant growth that produces more branches of and connections between neurons in the frontal cortex, in a process that peaks at about age 11 in girls and 12 in boys.”<sup>58</sup> As Craig Anderson of Iowa State University states, “Overall, the research is solid. Video games are powerful teachers of all kinds of things.”<sup>59</sup>

**Emotional Impact.** The video game industry has successfully produced games that engender strong emotions like awe, fear, power, and happiness in the players by creating a virtual reality that allows collaboration, social interaction, victory, and defeat.<sup>60</sup> How many times have you been emotionally involved in a classroom experience? Probably not that often. How many times have you screamed or heard your children scream and yell at the screen while playing a game?

Late one night, I was playing the first-person puzzle-adventure game *Riven*. I was alone in the spare bedroom exploring this eerie world. My wife was sound asleep in the other room as I lost track of time engrossed in the game. I was moving from island to island across dirt paths and rope bridges, carefully noting the strange creatures, vegetation, and sounds that were clues to solve a puzzle. I didn't know how they all fit together. Occasionally I came across signs of civilization, but the inhabitants rarely showed themselves. The sounds of the islands were all around me: water splashing against the docks, birds singing in the air, and crickets chirping. As I made a turn down a dimly lit path, a little girl coming out of nowhere darted in front of me, stopped, looked right at me, and ran away. I screamed.

My wife ran into the room to see if I was all right. I was startled and a little shaken (and by this time embarrassed). That virtual girl had given me a fright—not a virtual fright, a real one. I had trouble sleeping that night and didn't play the game for several days after that incident. That's the power of a game. Classroom or training events rarely touch students as emotionally as gaming experiences.

While playing a game like *Riven*, the gamer gets into a state that has been named the *flow state*.<sup>61</sup> The player forgets normal cares and the passage of time in the intense satisfaction from the sheer pleasure of performing the activity required by the game. The gamer is so enthralled that the game becomes a sort of reality, and he or she reacts just as he or she would in an actual situation, like screaming when startled.

“A successful game sucks the player in and doesn’t let him go.”<sup>62</sup> It immerses the player in the environment of the game. Gamers can get into “a sort of ‘groove’” where they become one with the machine and are “no longer aware of the user interface at all.” They enter into the “the infamous *Tetris Trance*.”<sup>63</sup>

**Motivation to Play.** A key prerequisite for entering the flow state is intrinsic motivation. The player must want to be engaged in the game, not because someone tells him or her to be engaged but because of a desire to be engaged. This is also a crucial element in real-life learning.

Under the right conditions, a game player sees each frustration, each failure, as an opportunity to get it right on the next try. Finally getting it right automatically establishes a new level of skill that encourages the player to attempt a more difficult move, and that achievement enables reaching a still higher skill level. The act of obtaining that new skill and the promise of learning a subsequent skill are highly motivating. This is part of the reason gamers can spend all day playing a game. They are slowly but surely learning a new skill at each level and making steady, visible progress toward their goal of defeating the game, bettering their time, or finding the hidden treasure.

The constant visual and verbal feedback is a basic principle of good game design: there must be a reaction to the player’s every action to sustain the player’s entertainment.<sup>64</sup> If the player hits keys on the controller or clicks the mouse and the game does not respond, the player becomes frustrated or bored and may stop playing. However, the player will quickly recognize a simple beep or tone as a signal that there is no play-relevant response and try another option.

Another key design element is the use of nonlinear stories and nonlinear sequencing. The nonlinear aspect of a game environment enables each player to live the world of the game in his or her own way and enables the player to

find different ways to replay the same game, thereby expanding the opportunities for interest and enjoyment.<sup>65</sup>

As a consequence of these interface elements and the immersive nature of the game environment, the gamer generation has picked up tendencies, traits, and behaviors that are very different from those of the boomer generation or even Generation X (people born between 1965 and 1979). Generation X, while having some differences with the boomer generation, did not grow up with the dual technologies of the Internet and video games. Gen Xers are digital immigrants just like the boomers. The first generation to be fully immersed in video games and the Internet is the gamer generation.

**Economic Power of Games.** The alluring power of video games has created huge financial opportunities for companies that create, market, and distribute electronic games and game consoles. As the video game industry becomes bigger and generates more revenues, it is exerting more and more pressure on popular culture worldwide. Movies now star video game characters like the fictional star of *Tomb Raider*, Laura Croft, who has appeared in two movies. There is even a debate about whether the video game industry is generating more revenue than Hollywood.<sup>66</sup> No matter which side of the debate you come down on, the fact is that video games are generating a lot of money and influence over an entire generation across the globe.

In Europe, video game playing is more popular than ever. In fact, Ireland has the highest per capita ownership of the Sony PlayStation game platform outside of Japan.<sup>67</sup> In Germany, one in ten households owns some type of video game platform.<sup>68</sup>

The French government is using a Web-based game to help its citizens understand the complex issues involved with balancing the budget. The French Budget Minister, Jean-Francois Cope, has supported the creation of *Cyberbudget*, an online game focused on the trade-offs required to balance a national government's budget.<sup>69</sup> The game allows players to manage 300 billion virtual euros as they attempt to balance spending in the areas of education, the military, and social programs.

France also has named three video game creators to its prestigious Order of Arts and Letters. This is the first time electronic games artists have achieved

France's highest award for culture. The honorees are Nintendo's Shigeru Miyamoto, Ubisoft's Michel Ancel, and Frédérick Raynal, director of the original *Alone in the Dark* game.<sup>70</sup>

In Asia, Japan dominates the worldwide console market with Sony and Nintendo games and game consoles. The South Korean game market is expected to reach \$2 billion by the end of 2007—an 18 percent increase from its 2006 size of \$1.7 billion.<sup>71</sup> In China, increased broadband access has created an online gaming boom. The market for online games in China is about \$683 million with twenty-seven million gamers.<sup>72</sup> The Chinese's market is expected to grow at a compound annual growth rate of 24 percent during 2005–2010 until it hits \$2.1 billion.<sup>73</sup>

Overall the combined video game market in Europe, the Middle East, and Africa is projected to grow at a compound annual rate of 13 percent through 2010 to reach a \$13 billion market size.<sup>74</sup>

This worldwide demand for video games has created huge financial opportunities for companies like Electronic Arts, a Redwood, California, interactive game developer. In fiscal year 2006, the company posted revenues of over \$2.95 billion and has over twenty-seven titles that have sold more than 1 million copies.<sup>75</sup> Atari's blockbuster *Enter the Matrix* sold 4 million copies and brought in \$250 million worldwide.<sup>76</sup> Electronic games are debuting everywhere, from exercise machines to cell phones.

The gaming juggernaut is not slowing down. It's not even breaking stride. Experts estimate that non-PC devices supporting electronic games will rise from \$415 million in 2004 to at least \$2.6 billion by 2010. The online Internet game market is forecast to increase to \$1.7 billion by 2007.<sup>77</sup> And the worldwide market for video games is expected to grow at an average 11.4 percent compound annual growth rate to \$46.5 billion by 2010.<sup>78</sup>

## Traits of Gamers

We know that gamers are learning from games. The question is, What are they learning? John Beck and Mitchell Wade discovered some interesting and possibly counterintuitive traits as they conducted research for their book *Got*

*Game: How the Gamer Generation Is Reshaping Business Forever.* Here are some of the traits they discovered within the gaming generation:<sup>79</sup>

- Analytical/problem solvers
- Multitasking
- Competitive
- Resilient
- Confident
- Sociable

## **Analytical/Problem Solvers**

Gamers are confronted with a problem every time they pick up a controller or a mouse. They spend much of their time analyzing and solving puzzles, working through mazes, searching for objects, keeping characters happy, finding clues, and figuring out the location of the next round of ammunition. They have learned to break down the game environment into its basic elements and then determine how each element fits together:

- Should I take the path on the left or the right?
- What do the clues I have gathered so far tell me?
- Where can I find a locked door now that I have located a key?
- Where do I hit my opponent for the maximum impact?
- What are some other ways I could solve this problem?
- What am I not seeing?
- What other information do I need to find a solution?
- How is this situation similar to others I have faced?

All of this problem solving and analysis is done on-the-fly. The game continues while the gamer figures out what to do next. Gamers must be able to think quickly, react quickly, and make crucial decisions within seconds. A wrong analysis or conclusion means the gamer forfeits a life, goes back a level, or is defeated at the hands of the enemy.

Gamers have to be detailed. They need to observe the environment in which they are playing and determine if a wall contains a secret passage or an enemy is hiding behind the next door. They have to look for subtle cues and make decisions while misleading cues compete for their attention. Gamers are constantly analyzing their moves and actions to figure out how to get to the next level, defeat the monster at the end of the game, or find the next star. They have developed the ability to quickly assess a situation and determine what to do next. This ability translates to the real world.

One unusually hot Saturday in late September, after I had torn my oldest son away from his latest computer game obsession, *Chip's Challenge*, my wife, two boys, and I went to a local corn maze. A corn maze is a lot of fun: it is literally a life-sized maze cut into a corn field that you walk through collecting clues and completing activities found throughout the maze.

After about two hours in the five-acre maze, my wife and I were ready to go home, but we couldn't find the exit. Finally, we came across a rest station that had a huge map of the maze nailed onto a post. My wife and I stared at the map but couldn't figure out how to get to the exit from our location. We were tired, hot, and hungry. Also, my wife was getting a little snippy. I, of course, was calm, cool, and collected. The activity had ceased to be fun. We studied the map but could not discern a good path for our exit.

My oldest son (Gamer 4.0) looked at the maze map for a few moments and then said, "Follow me." We did and were out within five minutes. I asked him how he could read the maze so well. He said, "*Chip's Challenge*."

*Chip's Challenge* is a game from Microsoft where a small guy named Chip runs around mazes collecting computer chips. You guide Chip as he runs round collecting these prized items. At every level, the player encounters a progressively more difficult maze, and there are about one hundred levels (Figure 1.3). Unbeknown to my son and luckily for me and my wife, he had been studying how to get out of corn mazes for several weeks.

Think how helpful a similar game might be for guiding new employees through the cubicle mazes that are the hallmark of large companies. No matter how many times I visit a mammoth organization, I am always a little confused when trying to find a particular cubical.

**Figure 1.3.** The First Maze in *Chip's Challenge*.

Source: Microsoft's *Chip's Challenge* product screen shot, reprinted with permission from Microsoft Corporation.



Gamers are not intimidated by mazes or puzzles or problems. They face these challenges and solve them on a regular basis. Gamers are forced to think strategically. They play war and strategy games that previously were reserved for military or industrial strategists. They act as social psychologists when they make sure their *Sims* character has enough human contact, exercise, and food to be healthy. The gamers don't look at pictures of animals in a zoo; they become the zoo keeper, the architect, and the businessperson running the zoo in Microsoft's *Zoo Tycoon*. Gamers are forced to operate at a high level of thinking. Otherwise they would never get past level one.

Game developers understand this analytical and problem-solving allure and even develop games within games to draw in gamers. The developers place extra scenes, help codes, and other enticements in games for the gamer to find. These are fondly referred to as "Easter eggs."<sup>80</sup> An Easter egg is a message, graphic, sound effect, or unusual change in program behavior that occurs in response to some undocumented set of commands, mouse clicks, keystrokes, button presses, or other stimuli intended as a joke, an amusing entertainment piece, or to display program credits. The first known video game to feature an Easter egg was the Atari game *Adventure*. In the game, the designer's name would be displayed if the player moved a hidden item to a certain location.<sup>81</sup>



Gamers like to apply their skills and analytical abilities to solve problems. They tend to have “intuitive technical skills, problem-solving strategies, and attitudes that just couldn’t have evolved outside their digital world.”<sup>82</sup> They have learned to be keen analysts and problem solvers.

## Multitasking

Here is a scene that drives boomers crazy: a gamer sits at the computer working on a project that is due tomorrow. Dozens of open windows are displayed on the screen: the MS Excel spreadsheet for crunching numbers, an Instant Messenger window, a weather ticker, and a search engine page, to name just a few. All the while, the gamer is jamming to the tunes playing on the multi-colored MP3 player and watching the cell phone to see if there are any calls. How can anyone work with all those distractions? For boomers, this is information overload. For a gamer, it is standard operating procedure (Figure 1.4). They have never experienced information underload; they’ve always had too much information.

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**Figure 1.4.** Gamer Working with Distractions.

*Source:* Reprinted with permission of the artist, Kristin Longenecker.



Information has always been available at the fingertips of gamers. Gamers with a question search the Internet for an answer and instantly look up what they need to know. The television provides twenty-four-hour networks of news, information, and trivia, all with a ticker at the bottom providing—what else?—additional information. You can watch cooking shows all night or cartoons until your side hurts from laughing. Boomers grew up with three channels to choose from, and most of those signed off at midnight.

Gamers have adapted to information overload by embracing the technologies that allow them to be constantly informed and updated. They surf the Web, text-message friends, subscribe to podcasts, and stay connected to information and each other through the dizzying assault of information.

Video games contribute to the information overload of the gamers. To achieve mastery in a video game, you need to know what activities you can ignore or disregard and which activities require your attention.<sup>83</sup> Switching from focusing on one task to quickly focusing on another is an important skill set gamers have learned. “Games might have trained a whole generation to multitask a little more easily, or to routinize tasks the rest of us have to actually think about.”<sup>84</sup>

Gamers need to have multiple channels of input. They can easily become bored with just one stimulus. It seems that they want to quickly move back and forth from one activity to another as they are completing tasks and processing information.

## **Competitive**

This is obvious: gamers like to win. Why? Games are about winning. Gamers are motivated to rise to the challenge of a game. “To put it mildly, gamers believe that winning matters.”<sup>85</sup> Gamers believe that competition is the law of nature and that they must always compete. This gives them an incredible competitive drive.

While it would seem to make them hypercompetitive and have a win-at-all-costs attitude, this is not the case. Gamers compete against themselves and the game first. They compete against each other second. They admire the skills and abilities that make someone an excellent game player. They reward

and exalt fellow gamers who share gaming tips, cheat codes, and Easter egg locations. The competitive spirit of the gamers is mostly a healthy competition, where the gamer wants to be a hero and wants to win but not always at the expense of others.

Gamers are willing to take calculated risks to be successful and win. They have learned through game play that if they take the right risk, they will be richly rewarded, at least virtually. This risk-reward trade-off has preconditioned them to think through situations and determine which risk is worth taking. They don't want to win at all costs; they want to make the right decision that will provide the highest reward for the lowest amount of effort.

## Resilient

It is not that other generations haven't been resilient; they have. Everyone has had a coach or teacher who wouldn't let them quit, spurred them on to greatness, or stayed with them until something was finally learned. The difference is that those episodes were sporadic and intermittent; video games allow everyone who plays them to have that experience over and over again.

How can you not learn to be resilient when you have multiple lives or multiple chances to try the same thing over and over again until you get it right? Games teach that if you work hard enough at something, you will eventually master the skill or technique you are seeking (or at least move up to the next level). "Gamers know from countless attempts to maneuver through fictional mazes and dungeons that trial and error is the preferred way to tackle a problem."<sup>86</sup>

It is not like a real-life soccer game where if you touch the ball with your hand in the penalty box the other team gets a free kick and your team risks losing the game because of your mistake. If you mess up in a video game, you just start over. If you do really poorly, don't save the results. Press the Reset button and start over. If you try hard enough, you'll eventually beat the level. This resilience means that gamers are willing to take a chance to see what happens. They don't have to get everything right the first time.

Internet surfing is the same: if you don't find what you are looking for with the keyword search combination you tried the first time, you try another

combination and see if it works. Eventually you find what you are looking for. A generation that has grown up searching for information on the Web and playing games over and over again is familiar and comfortable with trial and error. They are willing to fail and then are able, even eager, to bounce back and try the same thing again but in a different way. This is in total contrast to, say, that well-known boomer Wile E. Coyote from *The Road Runner* cartoon. In almost every episode, Wile E. would use some type of Acme device, like the Acme Steel Wall or Acme Tiger Trap, in an attempt to catch the Road Runner. He always failed. However, instead of trying to tweak the product or make minor adjustments and try again, he would simply purchase a new item. He was definitely a boomer.<sup>87</sup> Had he been a gamer, he would have made minor adjustments, tried over and over again, and caught the Road Runner. Beep-beep.

## Confident

Progressing from one game level to another, defeating countless villains, and conquering worlds gives gamers a strong sense of confidence. They can handle whatever is thrown at them. After all, they've beaten the final level. "Gamers believe in themselves and in their own ability to create exceptional value."<sup>88</sup> They have been "trained" to be confident by the games they have grown up playing.

In their research, Beck and Wade found that gamers label themselves as experts even at their relatively young ages. They are confident in their technical skills. They believe that because they are talented and smart, they don't need to work as hard as other people to get the job done. They think of themselves as working smart, not hard.

This self-confidence is one reason that gamers believe in a pay-for-performance system. They would much rather be paid for results than, in their minds, unproductive face time. Gamers believe in results and not necessarily in the process. Whatever it takes to get the desired results is what drives a gamer. They are confident they can accomplish whatever needs to be done; they don't want someone looking over their shoulder.

Gamers are also confident because they are digital natives.<sup>89</sup> They see the boomers and even some Generation X coworkers struggling with technology and wonder why. The gamers grew up with technology and are perfectly comfortable sitting in front of a program or game they've never seen before and diving right in. This comfort level with technology has given them confidence in their abilities with computers and related gadgets. No other generation has this confidence level.

## Sociable

This trait seems to fly in the face of what everyone intuitively knows about gamers. How can spending all that time alone with a video game make a gamer sociable? Watch a group of kids playing a video game, and you'll find out.

My older son constantly has friends over to play video and computer games. He invites two or three friends over, and they begin to play a game. If it is a single-player game, they negotiate with each other who is going to play first and for how long: "Until you get killed and then it's my turn" or "Until you get to the next level." They provide constant advice and counsel to each other to help their fellow game players beat the level or avoid getting killed. "If you go through the building you avoid running into three bad guys." "No, no, go left at the barrel." "Press square, triangle, circle while pressing R2. It's an awesome combo move."

Inevitably my younger son wanders in and wants to be part of the game play. On a good day, the group will let him play and give him the controller at certain points in the game where they know he can be successful: "Okay, you get this guy through the window and onto the roof and then give me back the controller." Once he is successful, he hands back the controller. The entire exchange, negotiation, turn taking, and playing of the video game is worked out among the kids.

Now, sometimes it gets out of control, but most of the time, they are good for several hours until someone calls in the parents. During the game-playing process, the players learn to delegate, take turns, rely on others for help, and work together to achieve a common goal. They are a self-directed team. There

is no authority figure; they determine who does what and how to solve the problem facing them.

Research empirically validates the anecdotal evidence: “Our survey made it very clear: Gamers are not isolated, introverted, or unsociable. In general, they care about people exactly as much as the rest of us do.”<sup>90</sup> Gamers are also the IM-e-mail-cell phone generation who are in constant contact with each other. They invented the concept of an instant social event and coined the term *flash mob*. A flash mob is a gathering organized using technology, primarily e-mail and cell phone text messages. A group of people assemble suddenly in a public place, do something unusual or notable, and then disperse.<sup>91</sup> After the event, the participants continue with their other activities.

Flash mobs and other social events indicate that gamers are sociable, but not in the traditional sense of socialization. Gamers don’t make phone calls; they text-message. They don’t write letters; they send e-mail. Gamers will sit in their home and text-message a friend who lives right next door. They do not require face time to be sociable; they use technology to socialize.

## The Chasm

The differences between the gamers and the boomers are not superficial. In fact, some would rename the “knowledge gap” the “knowledge chasm.” *Gap* or *chasm*, organizations are faced with a daunting task: transferring the hard-earned knowledge of the boomers to the techno-savvy gamers. The problem is that these two groups have different beliefs, attitudes, and expectations for the workplace. As a boomer writer for *USA Today* comments, “My generation didn’t grow up with video games. We don’t care much about them.”<sup>92</sup> While boomers might not care about them, they have certainly influenced an entire generation—a generation that is now entering the workforce, permeating academic classrooms at every level, and butting heads with the boomer managers, bosses, and instructors.

In the next ten years, the biggest issue facing corporations, academic institutions, and government agencies is going to be the transfer of knowledge

from the boomers to the gamers. This issue, if not handled correctly, will have an adverse impact on every segment of society. The stakes are high and the issues real.

With their technology training and savvy coming from playing video games and surfing the Internet, gamers can seem intimidating to boomers. The boomers, though, are in control of the workplace and classroom. They set the rules, teach the classes, and control the capital. Gamers who have grown up with interactive experiences, self-directed work teams, and informal communication channels are not going to want to sit in a classroom or confront online learning modules that have no interaction and no game elements. Gamers are impatient and anxious to get to the next level.

Boomers will find it difficult to articulate and make tangible the knowledge they have in their heads about customers, procedures, operations, and academic subjects. Even the basic everyday tasks of boomers will be difficult for them to explain: “I just see the issue and resolve it. If you put in enough hours, you’ll figure it out.”

Teachers cannot continue to lecture to rows and rows of gamers sitting in colleges and universities, high schools, or even elementary schools. As Bill Gates said in an address to the National Governors Association, “America’s high schools are obsolete. By obsolete, I don’t just mean that our high schools are broken, flawed, and under-funded—though a case could be made for every one of those points. By obsolete, I mean that our high schools—even when they’re working exactly as designed—cannot teach our kids what they need to know today. Training the workforce of tomorrow with the high schools of today is like trying to teach kids about today’s computers on a 50-year-old mainframe. It’s the wrong tool for the times.”<sup>93</sup>

This chasm between what is taught in high school and what is needed in the workforce is clearly illustrated in Table 1.2. Boomers and gamers have different perceptions of information, work structures, software applications, and communication channels. Each generation has had its ideas and perceptions shaped by its environments and pastimes. The trick is to find a way for the boomers to transfer their knowledge, experience, and know-how to the gamers in a manner that is efficient, practical, and effective for gamers.

**Table 1.2.** Gamers' and Boomers' Differing Perceptions.

Source: Some material from Prensky, M. (2001). *Digital game-based learning*. New York: McGraw-Hill, pp. 46–47.

Perception of . . .	Boomer	Gamer
Knowledge	Structured (books, memos, standard operating procedures)	Unstructured (instant messaging, blog, e-mail)
Organizational structure	Hierarchical team-based structure	Level playing field, equality
Communication channels	Formal (face-to-face, telephone calls)	Informal (instant messaging, e-mail, text messages)
Software applications	Interface and information are separate	Information is the interface
Career advancement	Patient ascent	Impatient rapid ascent
Learning environment	Classroom	E-learning
Gadgets	Fun to have	Essential
Video games	Distraction, entertainment, waste of time	Way of life
Information processing	Linear	Multitasking
Technology comfort level	Digital immigrant	Digital native

To make matters worse, gamers are not used to learning in the same fashion as the boomers. Gamers are self-educating. They seek out and learn from the information that is available to them. They do not rely on formal educational settings for their learning. The gamers' learning style:

- Ignores any hint of formal instruction. They are self-directed learners.
- Includes trial and error and approaching a problem from different angles.
- Relies heavily on learning from peers, with a distrust of information from authorities.



- Focuses on small, focused bits of information.
- Demands just-in-time information. They don't want to learn about what they might need.
- Is not focused on books and reading.<sup>94</sup>

In spite of differences in learning style, attitudes, and beliefs, this chasm must be crossed. There is too much at stake in terms of productivity, profitability, and public safety. The differences between the two groups must be overcome with a focused and targeted approach. It's too bad we can't take a page from the baby boomer classic *Star Trek* and do a Vulcan mind-meld between the boomers and the gamers. Barring any mind-melds, the alternative is to find a way to build a bridge over the chasm.

## Building the Bridge

Schools are failing gamers, as are corporate training programs. The traditional methods of passing knowledge from one person to another are inadequate for this age and these learners. Our current learning paradigms, institutions, and techniques are a hindrance to learning for gamers. For example, if a company has forty-five hundred employees to train on a new product initiative and it can train only 250 employees a month using traditional stand-up training, it will take eighteen months to train all its employees. If the life of that product knowledge is eighteen months, then by the time the last group is trained, the product information is obsolete. Organizations must find methods for faster deployment of instruction.

Fortunately, many tools already exist to bridge the gap from boomers to gamers. Unfortunately, many of these tools exist in noncorporate and nonacademic settings. The tools that are needed come from the game and electronics industries. Adaptation of these tools will provide an effective method of knowledge transfer. Boomers must understand that the toys of today—the gadgets, games, and gizmos—are the business and academic tools of the future.

Time is not a luxury in this situation; the boomer exodus is happening as you read this page, and the time for action is now. Rules need to be broken,

new paradigms established, university structures rethought, and old training techniques replaced with new methods as existing training department structures are torn apart and rebuilt. Schools and academic institutions must redefine learning and redeploy resources. Executives, training managers, employee supervisors, and others must rethink how they educate new employees.

The current boomer-controlled, team-based command-and-control structure must morph into a self-directed virtual learning environment. Organizations need to tap into the existing inclinations of the gamers and provide educational experiences in harmony with the way they learn and seek new information.

## What's Coming in This Book

How to accomplish this goal of knowledge transfer is the topic of this book. So far, we have discussed the differences between the boomers and the gamers, as well as examined the tremendous challenge and opportunities that lie ahead in terms of transferring knowledge from one group to the other. Next, we discuss how to accomplish this goal.

## Outline of Chapters

The next few chapters introduce tools, ideas, and practical tips for bridging this gap. Stories, anecdotes, statistics, and expert insight provide a foundation for action and practical tips to turn the toys and trinkets of the gamer generation into the business tools of the future.

In Chapter Two, the focus is on using games to teach basic but essential knowledge: facts, concepts, and rules. Chapter Three discusses the use of simulations to teach advanced knowledge like procedures, principles, and problem solving. In Chapter Four, the use of handheld gadgets by the gamers is discussed, and methods of using those gadgets for transferring knowledge are explored. Chapter Five provides a look at how gamers use cheat codes and exploit rules of video games to their advantage and describes methods of incorporating some of that thinking into business and academic settings. Chapter Six describes how institutions must move information and knowl-

edge out of rigid course structures to create small, easily searched bite-sized nuggets. Gamers are used to Googling information, not reading manuals. In Chapter Seven, the concept of replacing education with automation is discussed, and examples are provided to explain why automating a process is often better than trying to develop and maintain a training program. Chapter Eight offers a look at the gamer's expectations of a boss and a teacher. These expectations are far different from those of other generations. In Chapter Nine, issues of recruitment and retention are explored. Gamers will be attracted to certain types of organizational cultures and turned off by others. Chapter Ten provides practical methods of selling the concept of introducing gadgets and games into a corporate or academic environment. Introducing innovative technologies can be difficult, and when those technologies are associated with games or electronic toys, the level of difficulty is magnified. In Chapter Eleven, the concept of knowledge requirements planning is introduced. This is a systematic process for creating an enterprisewide approach to the boomer-gamer knowledge transfer issue. The book concludes in Chapter Twelve with a discussion of personal actions that gamers and boomers can take to better understand one another and provides a glimpse into the future.

In each chapter, I point out workplace implications. This section describes how the concepts discussed in the chapter can be applied in both academic and corporate settings to be successful and what the ideas introduced in the chapter mean when they are applied in a practical setting.

## **The Best Way to Read This Book**

The ideal approach to reading this book is as a team or group consisting of boomers, gamers, and Generation Xers. Divide your team, department, or faculty into reading clubs, and read a chapter each week. Once a week, the group should get together and discuss the salient and thought-provoking points. How is our organization dealing with this issue? Have we seen these traits in new employees or incoming freshmen? Can we sell simple games to our leadership? How do we implement these ideas?

This group approach will spark discussion, provide insightful solutions, and guide you to develop your own methods of transferring knowledge and

dealing with the boomer-gamer knowledge gap. It will also lead to discussions between the boomers and the gamers of the organization that would not occur otherwise. These conversations, even when off-topic, will be valuable in strengthening your organization and are one of the first tangible steps you can take to bridge the boomer-gamer knowledge gap.

## **Continuing the Discussion**

A topic like this does not remain static; it is constantly moving. In an effort to continue the dialogue in real time and make progress in bridging the boomer-gamer knowledge gap, I have created a Web site, [www.gadgetsgameandgizmos.com](http://www.gadgetsgameandgizmos.com), that contains a space for you to respond to a blog on the subject, a wiki for you to update terms and definitions, and a podcast on the topic. You will find lists of resources and white papers to help you manage the boomer-gamer knowledge transfer. Most important, you will find room to contribute your own knowledge, thoughts, and wisdom on the subject. Visit it and use the tools discussed in this book to further your knowledge and experiment to see how they can help you and your organization.

This book provides a list of recommendations and techniques for recasting our existing training, academic, and computer systems into tools for bridging the knowledge gap. These new tools will push the knowledge and innovation envelope. Academic, corporate, and nonprofit organizations that adopt these tools and techniques will not only survive the transition; they will profit from it as well.