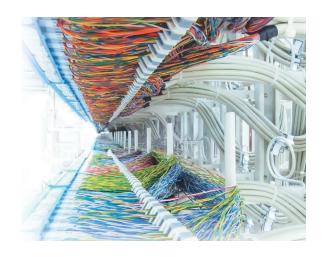# Game Accessibility: Enabling Everyone to Play

Lee Garber

There is a growing push to make computer games accessible to the disabled.

Most people play computer games—whether on a desktop, console, or smartphone—without a second thought.

However, those with disabilities—such as blindness, deafness, partial vision or hearing loss, color blindness, motor or dexterity impairments, and cognitive limitations—often find playing games to be difficult or impossible.

They are frequently unable to see screens clearly or at all, distinguish colors, operate complex controllers, or hear sounds that announce or indicate important game events.

The importance of these limitations is magnified as games are increasingly used for activities such as education, training, and healthcare.

There are now growing efforts to develop technologies and techniques—which the sidebar "Helping Disabled Gamers" details—to make games accessible to disabled individuals and to convince game developers to take action.

A number of developers are already doing so. However, said Rochester Institute of Technology (RIT) professor Kevin Bierre, many games remain inaccessible to people with disabilities.

Experts say most game companies just don't think about the disabled or know what could be done to help them.

To help change this, advocacy groups are increasing their education efforts and working more closely with developers.

CURRENT STATE OF AFFAIRS

Recent academic studies indicate that in the US alone, perhaps 2 percent of the population (about 6.3 million people) cannot play computer games because of a disability, and 9 percent (about 28.4 million) can play only at a reduced level.

In a 2008 survey of gamers by customer-research provider Information Solutions Group for PopCap Games, 20.5 percent of the 13,296 respondents reported a physical, mental, or developmental disability, compared to 15.1 percent of the US population.

Of the disabled respondents, 22 percent described their conditions as mild, 54 percent as moderate, and 24 percent as severe. Also, 46 percent said their primary disability was physical; 29 percent, mental; and 25 percent, a developmental or learning impairment.

The survey also found that 11 percent of respondents said a physician, psychiatrist, physical therapist, or other medical professional prescribed or recommended casual-game playing as treatment for their condition.

Disabilities and game playing

Sensory impairments entail the full or partial inability to see or hear. This affects players who, for example, can't see audio cues; recognize different players, threats, or obstacles; or distinguish colors. Gamers who can't hear well miss the dialogue between characters, audio instructions, or cues such as explosions.

People with motor impairments—like cerebral palsy, Parkinson's disease, paralysis, and multiple sclerosis—have trouble using parts of their body. This keeps many players from effectively utilizing consoles and manual-input devices.

Individuals with cognitive impairments have deficits either in overall intellectual performance

HELPING DISABLED GAMERS

Advocates for the disabled say that it isn't particularly difficult, expensive, or time-consuming to make games more accessible. They contend that a few measures—such as subtitles, hue adjustments to help the color-blind, and options to increase the size of text and characters—could help quite a few people who now have trouble playing.

However, they aren't enough to address the needs of many people.

Suggestions for further improvement include

- upgrading gaming system's hardware support for various types of assistive controllers and input devices,
- allowing players to enter all commands via the keyboard and providing visual and auditory messages to indicate what has occurred,
- implementing an auto-pass system that lets players skip sections that are difficult because of their disabilities, and
- using artificial intelligence to determine ways to help disabled gamers with tasks.

Assistive techniques

In some cases, general assistive technology for computer users—including screen readers and magnifiers—could help disabled gamers. There are also game-specific approaches for helping them.

For people with sensory impairments, game makers could

- enhance stimuli by, for example, implementing high-contrast color schemes, using bigger font sizes, utilizing elements other than just color as a way to identify game elements, employing a color scheme that works for the color-blind (avoiding hues some have difficulty distinguishing, such as red and green), providing zoom capabilities, and giving players the ability to change brightness and contrast settings;
- provide slower text-scrolling rates;
- replace stimuli by offering subtitles or closed captioning, using speech synthesis, and providing haptic cues;
- implement text-to-speech features that voice game text;
- let users adjust various speech features, including speed;
- for the increasingly popular online games, let players communicate with one another via text message or voice;
- annotate content with semantic information;
- provide voice feedback to identify objects; and
- let blind players use the numeric keyboard to turn a character in different directions.

For those with motor impairments, game makers could

- support or provide multiple types of input devices and techniques, such as special switches, keyboards, mice, joysticks, controllers, and brain-computer interfaces;
- automate or eliminate the need for certain types of difficult-to-provide input;
- minimize button use;
- let gamers customize controllers' configuration and sensitivity to pressure and other manual input; and
- provide a very basic set of controls.

For players with vocal impairments, game makers could

- let gamers select commands from a menu or via controller movements, rather than by using speech recognition; and
- enable players to communicate by texting or chatting.

For participants with cognitive impairments, game makers could

- reduce the number of game objects;
- simplify the story line;
- make the game slower;
- eliminate or automate many inputs, or provide wizards to ease the process; and
- offer players hints as to what's going on and what actions they could take.

Stated Rochester Institute of Technology professor Kevin Bierre, "Some disabilities are easier to address than others. A great deal of work has been done on helping gamers with low vision or blindness. Deafness has a set of fairly standard approaches, too. Other areas are more difficult to address, such as dealing with custom controllers for gamers with motor disabilities."

One key to game accessibility is the playing platform, said Steve Spohn, editor in chief at the AbleGamers Foundation, an assistive-gaming advocacy organization.

"Mobile gaming is the most difficult because there are very few peripherals to make [wireless devices more accessible], and the ones that do exist involve using a computer to bridge the gap," he explained.

Computer-based gaming is easier than console-based gaming, he added, because PCs have much more adaptive technology built in.

"The best approach is designing for accessibility from the outset, working with specialists in the field and people disabled by the design barriers you wish to remove," said Barrie Ellis, technical specialist with SpecialEffect, an organization that uses technology to help the disabled, and also director of http://OneSwitch.org.uk, an assistive-technology website.

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because of conditions such as mental retardation or in specific areas due to conditions like dyslexia. This leaves some people completely or partially unable to understand how to play a game or manage complex situations.

Other disabilities can cause problems for players. For example, the inability to speak can leave a player incapable of providing vocal commands in games that require this.

Several countries, including the US, have laws and regulations about general product accessibility for the disabled.

For close to 10 years, organizations that advocate for the disabled have proposed ways to make games more accessible. For example, in 2004, the

International Game Developers Association (IGDA) Special Interest Group on Game Accessibility proposed 19 accessibility guidelines.

However, many games are still completely or largely inaccessible to the disabled.

These issues also affect other people. Many gamers who use built-in accessibility options and utilities have no impairment and just want to

benefits, compared to 80 percent of all casual game players.

The most common benefits that disabled gamers cited were stress relief (81 percent), mood improvement (69 percent), distraction from disability-related issues (66 percent), better concentration (59 percent), and mental stimulation (58 percent). Also mentioned were deep feelings of achievement, and improved

making a game accessible is relatively small and the payoff of being able to sell more games is large," said UNR's Folmer. "Not everyone plays games, but even if 10 percent [of US disabled people] did, you could be selling over a half a million copies more."

In some ways, the disabled market might be especially lucrative for game companies. Compared to the overall casual-gamer population, those with disabilities play more often and for longer periods of time and consider the activity to be more important to them, according to the 2010 Information Solutions Group/PopCap survey.

As the world's population ages, more people will either develop impairments or have their existing problems get worse. Thus, the demand for accessibility will grow.

And the development and testing process necessary to provide accessibility could yield information that improves games for all players, noted RIT's Bierre.

Many games are still inaccessible to the disabled.

improve their playing experience. For example, a player might want to compensate for a temporary disability such as a broken arm or for environmental problems like noisy surroundings.

"I don't have a hearing impairment, but I prefer subtitles in games, just because dialogue is sometimes difficult to hear or understand," noted University of Nevada, Reno (UNR), associate professor Eelke Folmer.

Benefits

Advocates for the disabled say that increasing accessibility yields many benefits.

Social. "It is a matter of making the world a fairer and more accessible place," said Barrie Ellis, technical specialist with SpecialEffect, an organization that uses technology to help the disabled, and also director of http://OneSwitch.org.uk, an assistive-technology website. "More and more of society's time is spent in virtual worlds. Do we really want those worlds to unfairly disadvantage and exclude people due to unnecessary barriers?"

The 2010 Information Solutions Group/PopCap survey found that 94 percent of disabled casual gamers said that playing provides physical- or mental-health

coordination and manual dexterity.

Added RIT's Bierre, "I think [the feeling of] inclusion is one of the main drivers for people asking for accessibility in games."

"Of course, improved self-confidence and increased enjoyment come along with the territory," added Steve Spohn, editor in chief at the AbleGamers Foundation, an assistive-gaming advocacy organization.

"If you are someone who has a physical disability or a war injury—something preventing you from physically accessing the world—video games provide a window into an otherwise inaccessible world," he said.

Accessibility also helps disabled players participate in game-based learning and training programs.

Financial. Many gaming companies want to expand sales into demographic groups other than that of the typical young male player. The disabled could provide such a market.

Proponents say that enabling the world's many disabled people to play games would encourage them to buy the products, thereby generating revenue for developers. And the goodwill and publicity created by serving the disabled could also increase purchases by able-bodied players.

"I believe the investment in

BARRIERS

There has been some progress in convincing game manufacturers to make their products more accessible. However, these efforts face obstacles.

"Certain companies are more in tune with accessibility than others, [but] accessibility is not the top priority in many companies," said RIT's Bierre. "Most don't seem to care about making an accessible product."

Some analysts say that accessibility is generally a low priority for the game industry in part because many manufacturers are not fully aware of problems experienced by disabled players, don't realize how many players could benefit from increased accessibility, and have no idea how to provide it.

"Most are simply not aware that gamers with disabilities would like to play their games, so rais-

ing awareness is an important first step toward improving accessibility," said UNR's Folmer.

According to Bierre, "In most game-design books, there is generally very little information about the need for game accessibility. So, many new designers are coming out of school without an understanding of the need."

In addition, like all kinds of companies, game makers have limited money, man-hours, and time, and may not want to utilize many of these resources on accessibility. And in some cases, they might think there isn't a wide enough audience to make implementing accessibility features worthwhile.

Some developers are concerned that adding assistive features could "dumb down" or dilute their products, AbleGamers' Spohn noted. However, he said, that doesn't have to be the case. For example, he said, developers could let users turn assistive features on or off.

"The most important part of our message is always that accessibility should not hurt game play," said Spohn.

WHAT'S AHEAD?

So far, most assistive games have been developed by small companies, individuals, or researchers and thus lack the production quality of mainstream games. However, some bigger game makers have increased accessibility.

According to SpecialEffect's Ellis, noteworthy participants include Valve Corp., Namco, and PopCap.

"Many of our games rely on color as one of the key means of identifying what the player must do," noted Garth Chouteau, PopCap Games' senior director for worldwide public relations. "We started hearing from people who suffer from color blindness very shortly after introducing *Bejeweled*, and in *Bejeweled 2*, we added a color-blind mode."

Spohn praised Electronic Arts

for accessibility features it has added to games, such as remappable keys and subtitles.

"The industry has warmed up considerably over the past 10 years," he noted. "Yet there are still a few holdouts like Nintendo who ignore our requests for review copies [of games] and social-media outcry. They aren't

interested in making their Wii line more accessible, whereas Microsoft and Sony are at least trying."

Research

In general, stated RIT's Bierre, "accessibility research is coming from academia, including game-design departments, human-computer interaction programs, and some general computer science departments."

"We've conducted research into disabled gamers as an audience," noted PopCap's Chouteau.

SpecialEffect's Ellis said some advocacy organizations are also studying game-accessibility approaches. Spohn said that AbleGamers does this and has received valuable support from several game companies.

Overall, though, observed UNR's Folmer, "There's actually very little research being done on this topic. I think I'm one of the few researchers to have been awarded [US National Science Foundation] grants to investigate how to make virtual worlds and video games accessible."

"I do see a small uptick in research on game accessibility, though," he added, "probably because of the new [US Federal Communications Commission] rules that require game consoles to be more accessible by 2015."

Education

Advocates for the disabled say that educating game-company executives, developers, and the public is important to encourage increased assistive-technology use and development.

AbleGamers attends gaming-related conferences, hosts events at which disabled

Advocates say education is important to advancing game accessibility.

players can try out games, and reviews products for accessibility, said Spohn.

The organization also recently published *Includification: A Practical Guide to Game Accessibility* (www.includification.com/AbleGamers_Includification.pdf), an illustrated informational resource and reference guide that took a year to develop.

Several years ago, the Norway-based MediaLT organization published 34 game-accessibility guide-lines on its website www.medialt.no/en-US/english/12.aspx.

In 2012, the Spanish government's Centro de Referencia Estatal de Autonomía Personal y Ayudas Técnicas (State Reference Center for Personal Autonomy and Technical Aids) published *Best Practices in Video-game Accessibility* (www.videojuegosaccesibles.es/2012/04/buenas-practicas-de-accesibilidad-en.html).

Also last year, game studios, disability experts, and academics collaborated to produce a developer-oriented reference, *Game Accessibility Guidelines* (http://gameaccessibilityguidelines.com).

Overall, however, said RIT's Bierre, "education is lacking, and I'm not sure the situation will improve significantly in the near future."

Key factors driving increased accessibility will include disabled gamers continuing to make their needs known, efforts by advocacy groups, improvements in technology, and perhaps governmental requirements.

Public support for accessibility will also be critical, according to AbleGamers' Spohn.

In the short run, UNR's Folmer said, games probably won't become more accessible quickly. "There will be some minor accessibility features … but most video games will not be accessible to the majority of people with disabilities."

However, he stated, "I think game developers will increasingly realize that the age of

the average gamer is rising and the number of people with disabilities will increase significantly over the next decade."

Said RIT's Bierre, "I think games will gradually become more accessible as technology advances and as developers become more aware of the problem and the need for solutions."

SpecialEffect's Ellis explained, "You'd hope in a modern world with modern technology, barriers that stop people from being able to play would be much easier to remove. It's through people caring about fellow humans that we'll make the world a better and more enjoyable place. That includes making play areas more welcoming and accessible places."

Said Spohn, "All you have to do is ask any gamer what video games mean to them. They'll tell you how important they are, and in some circumstances, how life-changing these experiences can be. If you're trapped in a body that doesn't do what your mind commands it to, video games allow you to run, to jump and soar. Video games allow you to make lifelong friends, to be part of a community, to accomplish goals." ◼

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