

AT FOR VIDEO GAMING

You might dismiss video gaming as a pointless pastime for kids, but contrary to what you might assume, the average age of gamers, or those who play video games, is 31 (Lofgren, 2015). According to [comScore, Inc.](#), more than 1.2 billion people play video games worldwide.



According to an international online survey, 20.5% of gamers who play [casual video games](#) have a physical, mental, or developmental disability—that's more than one in every five. When these gamers with disabilities were asked to identify the benefits of playing video games, the most common benefits they selected were relieving their stress (81%), lifting their moods (69%), distracting themselves from issues related to their disabilities (66%), improving their concentration (59%), and getting a “mental workout” (58%). The survey also found that, compared to gamers without disabilities, gamers with disabilities tend to “play more frequently, for more hours per week, and for longer periods of time per gaming session” (MarketingCharts, 2008).

This informational guide provides an overview of accessible gaming. Here, you will find detailed information about accessible game consoles and video games, adaptive game controllers, as well as links to other helpful resources about accessible gaming. So now,

let's begin your quest to find the assistive technology (AT) devices that are right for you in the realm of video gaming.

Accessible Controls

Gaming requires a game console and a controller. Many game consoles come with accessibility features built-in. There are also alternative game controllers on the market if you have difficulties using the standard ones that come with the consoles.

Game Consoles with Built-In Accessibility Features

Among the popular game consoles that come with built-in accessibility features are Microsoft's Xbox One and Sony's PlayStation®4. These features allow you to modify and customize the game's output (e.g., audio, display) to meet your needs so that you can get the most out of your gaming experience. Below is a list of some of the accessibility settings you will find in each game console.

Xbox One

The following features are found in the "Ease of Access" section of Settings:

- Narrator-provides audio descriptions of what is displayed on the screen so it can be heard if you are blind or have low vision.
- High Contrast-changes the default color and highlighting to make text easier to read against its background if you have low vision.
- Button Mapping-remaps the buttons on the game controller to make the most important ones easier to use if you have upper extremity mobility limitations.
- Magnifier-zooms in on part of the screen and enlarges the text/images so they are easier to see if you have low vision. This tool can be used with a controller or keyboard.

PlayStation®4

Select "Accessibility" in the Settings menu on PlayStation®4 to access the following accessibility features:

- Text to Speech-provides audio descriptions of what is displayed on the screen so it can be heard if you are blind or have low vision.
- Zoom-zooms in on part of the screen so it is easier to see if you have low vision.
- Invert Colors and High Contrast-changes the default color and highlighting to make text easier to read against its background if you have low vision.
- Larger Text and Bold Text-enlarges text and bolds text, respectively, so it is easier to read if you have low vision.
- Button Assignments-reassigns the buttons on the game controller to make the most important ones easier to use if you have upper extremity mobility limitations.

Alternative Game Controllers

Video gaming is not a spectator's sport. It demands full participation and active involvement—demands that you can meet with AT if you need them. Here are a few game controllers that have been designed and customized for gamers who have difficulty using standard controllers.

Designed for individuals with limited to no upper body or extremity mobility, the [Ultimate Arcade 2 Limited Dexterity Video Game Controller](#) is fully compatible with most gaming platforms, including PlayStation®, Xbox, PC/Mac/Linux, Nintendo GameCube, Nintendo Wii U, and Android. Measuring 20.5 inches high, 6 inches long, and 3.5 inches deep, this customizable game controller consists of two large analog joysticks wrapped in sticky rubber wrap (making grasping easier) and 18 large fist-accessible arcade buttons. It also includes built-in, hands-free Sip-and-Puff or Bite switches, which you can activate by sipping in or puffing out a breath of air or by gently biting down on a mouth piece, respectively.

With the Ultimate Arcade 2 gaming controller, you can increase or decrease the sensitivity of the joysticks. This will come in handy if you are playing Gran Turismo, a racing simulator designed for PlayStation®, because reducing the sensitivity of either the left or right joystick will give you better control over your steering.

You can also program an external analog joystick and control it with your mouth, chin, foot, or head; remap the buttons to fit your preferences and abilities; assign the built-in, hands-free Sip-and-Puff or Bite

Benefits of Video Gaming

In an article published in the *American Journal of Play*, researchers Adam Eichenbaum, Daphne Bavelier, and C. Shawn Green summarize the long-lasting benefits of video games—particularly action video games. As their findings indicate, video gaming can:

- Improve your cognitive flexibility and executive functioning (e.g., information processing, working memory, planning, abstract reasoning, task-switching, and multitasking);
- Augment your basic perceptual skills (e.g., increase contrast sensitivity and improve crowded acuity and visual selective attention);
- Enhance your learning and brain plasticity;
- Fulfill a variety of your basic psychological needs such as autonomy (the belief that you have control over your own actions and decisions), competence (the belief that you have the skills necessary to achieve your goals), and relatedness (the feeling that you are socially connected with other people); and
- Help you stay mentally active so that you can guard yourself against the cognitive decline that typically accompanies normal aging.

switches to any of the fist-accessible arcade buttons; and assign a specific function to a button to help you perform a task that might otherwise be difficult to perform. For example, the Latching Mode function will hold down the assigned button for an extended period of time, and the Adjustable Speed Rapid Fire function will automatically press the assigned button repeatedly at a fast pace. So, if you are playing Gran Turismo, you can hold down the gas pedal without having to hold down the button on the game controller if you assign the Latching Mode function to it. The button will hold itself down until you press it again to release it.

Once you have connected the Ultimate Arcade 2 controller to your gaming console, place the controller on your lap with the joysticks straight out in front of you. Now you are ready to take full command of the game.

The [QuadStick](#) is a mouth-operated game controller designed specifically for individuals with no upper body mobility. It uses a joystick, four Sip-and-Puff sensors, a lip position sensor, a push switch, and voice commands to represent the inputs of a standard video game controller. A 32-bit ARM processor, which powers the device, converts these inputs into commands and transmits them to a PC or game console via a USB or Bluetooth.

The QuadStick can either be mounted to a table or clamped to tubing on a wheelchair using a mounting arm kit. Although it is sold separately, various types of mounting systems are available, each of which is approximately 24 inches in length and has a ball and socket adapter that allows you to adjust the QuadStick positioned at the end of the mounting arm.

The QuadStick is compatible with PlayStation®3, Android, and many PC games that use a joystick, mouse, or keyboard. And with a third-party USB adapter, you can use the QuadStick to operate Xbox 360, Xbox One, and PlayStation®4 consoles, as well as PC games that require an Xbox 360 controller.

The [Tobii EyeX Controller](#) is an eye-tracking device and software that allows you to control any laptop with a touchpad by the movement of your eyes if you have limited to no upper body mobility. In addition to providing you with navigational control in place of a mouse or touchpad, the Tobii EyeX Controller offers increased privacy and security. It automatically dims the computer screen whenever you look away from it, and with its biometric facial recognition capability, you can sign in to your computer without ever entering a password.

The Tobii EyeX Controller gives you access to a wide range of accessible games, such as Assassin's Creed: Rogue. In this immersive, action-packed adventure, you follow the main character, Shay Patrick Cormac, as he begins his epic hunt for assassins throughout North America. The eye tracker reads the movement of your eyes and adjusts the view on the screen accordingly, allowing your point of gaze to control the game camera's

field of view through the eye tracker's Infinite Screen feature. As a result, you can see what Shay sees and experience the story as it unfolds in front of you through the eyes of Shay himself.

The Tobii EyeX, which requires Windows 10, Windows 8.1, or Windows 7, measures 0.6 inches high, 12.5 inches long, and 0.8 inches deep and weighs 0.2 pounds. Mount the controller to your computer screen using the provided adhesive strip and connect it to a USB 3.0 port. Sit comfortably in front of your computer (approximately 14 to 37 inches away from the screen), and face the eye tracker head on so that the Tobii EyeX sensors can detect both of your eyes. Then, its game on! For a full list of Tobii's eye-tracking-enabled games and apps, please visit the [Tobii Apps](#) page.

[The Versatility of Video Games](#)

Video gaming is a fun and rewarding activity—especially with accessible game consoles and alternative game controllers. But truth be told, video games offer a broad range of benefits that extend far beyond its entertainment value.

Educational Games

In addition to providing enjoyable entertainment, another benefit of video games is that they can be used as a fun and interactive teaching tool. It is no wonder then that 74% of kindergarten to eighth grade teachers use digital games in the classroom, and four out of five of these teachers use games created exclusively for educational purposes (Lofgren, 2015).

According to Dr. Scott Allen, a clinician who works with students with autism spectrum disorders (ASD), video games can help teach new skills and strengthen social skills, such as turn taking, team work and cooperation, problem solving, healthy competition, and interpersonal communication. Incorporating games into social skills training can “assist students with seeing the relevance of the skills that they are learning. It also adds an experiential component to teaching that is likely to contribute to faster skill acquisition, application, and generalization” (Allen, 2016).

Here are two examples of video games that can be used as a tool to teach independent living skills to people with ASD or learning disabilities:

[Life Skills Winner](#) is a software application that provides step-by-step instructions on how to complete various social and life tasks. You earn points for each step you complete, and with those accumulated points you can redeem a prize that has been designated by your parent/guardian/teacher. Life Skills Winner provides instructions on the following tasks: washing hands, brushing teeth, standing at an appropriate distance when talking to someone, brushing hair, making a sandwich, recognizing faces, putting shoes on the correct feet, sorting laundry, and setting the table.

[Practice Street Crossing](#) teaches you the rules of the road. Through this software application, you learn why we use the crosswalk, how to cross the street only when the light says to cross, the dangers of crossing the street outside of the crosswalk, where to look for the crosswalk, and how to get across the street safely. If you try to cross the street anywhere other than the crosswalk or when the light says stop, an instructional message will pop up on the screen to explain why you cannot cross the street that way. Then you have to start over and try again in order to advance to the next level. Practice Street Crossing is a safe alternative for learning how to cross the street. You can learn the necessary skills and practice them in the comfort of your own home before putting them to the test in the real world. This game can be played on the PC, iPhone, and iPad.

Exergames

As noted in the *Benefits of Video Gaming* box above, video gaming offers many mental benefits. However, if we were to stop there, the list would be incomplete. Another added benefit of video gaming is its positive effect on physicality. Exergames provides interactive gaming that combines entertainment with physical and mental exercise.

There are many exergames on the market today. One example is the Nintendo's Wii U. The Nintendo Wii U is a motion-controlled gaming console that offers a wide range of exergames. The Wii U controller, known as the Wii U GamePad, comes with every console and has three built-in sensors that perform three different functions: the gyroscope measures the GamePad's "orientation based on gravity," the accelerometer measures "motion based on acceleration and velocity," and the magnetic sensor uses the Earth's magnetic field to determine where you are pointing the controller. Together, these three sensors track your movements in real-time and replicate them on the screen. As you point, tip, jiggle, tap, and swipe the GamePad, watch as your simulated video game character acts out your movements on the screen.

Notable Resource

[AbleGamers Foundation](#), also known as AbleGamers Charity, is a nonprofit charity organization that empowers children, adults, and veterans with disabilities through the power of video gaming. They work and advocate on behalf of the disability community to increase the accessibility of video games, and their staff of accessibility experts review video games based on accessibility's standard for all-inclusiveness. Written by developers and gamers with disabilities, [Includification](#) is AbleGamers Foundation's Game Accessibility Guidelines. Developers can use this website as a resource tool to learn how to add accessibility features to their game and help ensure that each game is accessible to people with varying disabilities.

Findings from numerous research studies also indicate that exergaming is beneficial for many gamers, particularly those with ASD. Their findings are as follows:

- Exergame's entertaining game-like features helped shift the gamers' focus away from the discomforts of exercise and onto increasing their exercising efforts.
- Compared to traditional modes of exercise (e.g., walking on a treadmill), exergaming brought on greater levels of enjoyment from gamers. This suggests that exergaming can help increase people's overall exercise behavior.
- Repetitive behaviors, a characteristic of individuals with ASD, often resulting in difficulties with social interaction, decreased significantly after exergaming.
- Physical activity done while gaming helped improve the attention span and academic responsiveness of children with ASD.

For More Information

[Contact us](#) at AbleData for information on these and other AT for gamers.

References

- AbleGamers Foundation. (n.d.). How can AbleGamers help you? Retrieved from <http://www.ablegamers.com/>
- AbleGamers Foundation. (n.d.). *Welcome to Includification - Actionable game accessibility*. Retrieved from <http://www.includification.com/>
- Allen, S. (2016, February 16). *The use of video games to teach social skills*. Retrieved from College Living Experience Web site: <http://experiencecle.com/2016/02/the-use-of-video-games-to-teach-social-skills/>
- Anderson-Hanley, C., Tureck, K., & Schneiderman, R. L. (2011). Autism and exergaming: Effects on repetitive behaviors and cognition. *Psychology Research and Behavior Management, 4*, 129–137. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3218790/>
- Broadened Horizons (n.d.). *Ultimate Arcade 2 Limited Dexterity Video Game Controller*. Retrieved from <http://www.broadenedhorizons.com/ultimate-arcade2>
- Computer Hope. (n.d.). *Casual gaming*. Retrieved from <http://www.computerhope.com/jargon/c/casual-gaming.htm>
- Eichenbaum, A., Bavelier, D., & Green, C. S. (2014). Video games: Play that can do serious good. *American Journal of Play, 7*(1), 50–72. Retrieved from <http://www.journalofplay.org/sites/www.journalofplay.org/files/pdf-articles/7-1-article-video-games.pdf>
- Gray, P. (2015, February 20). *Cognitive benefits of playing video games*. Retrieved from Psychology Today Web site: <https://www.psychologytoday.com/blog/freedom-learn/201502/cognitive-benefits-playing-video-games>
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- Grubb, J. (2012, November 27). Forget the Sixaxis - the Wii U's GamePad has nine-axis control. Retrieved from <http://venturebeat.com/2012/11/27/forget-six-axis-gamepad-nine-axis/>
- LeClair, D. (2014, February 10). *QuadStick: The video game controller for quadriplegics*. Retrieved from New Atlas Web site: <http://www.gizmag.com/quadstick-quadruplegic-game-controller/30781/>
- Life Skills Winner. (n.d.). *Interactive apps*. Retrieved from <http://www.lifeskillswinner.com/>
- Lofgren, K. (2015, March 3). *2015 Video game statistics & trends: Who's playing what & why?* Retrieved from Big Fish Games Web site: <http://www.bigfishgames.com/blog/2015-global-video-game-stats-whos-playing-what-and-why/>
- MarketingCharts. (2008, June 12). *'Disabled gamers' comprise 20% of casual-videogame audience*. Retrieved from <http://www.marketingcharts.com/online/disabled-gamers-comprise-20-of-casual-videogame-audience-4920/>
- Microsoft Xbox. (n.d.). *Ease of access settings on Xbox One*. Retrieved from <https://support.Xbox.com/en-US/Xbox-one/games/ease-of-access-settings>
- Nintendo. (n.d.). *Brunswick Pro Bowling*. Retrieved from <http://www.nintendo.com/games/detail/brunswick-pro-bowling-wii-u#>
- Nintendo. (n.d.). *Mario Tennis: Ultra Smash*. Retrieved from <http://www.nintendo.com/games/detail/mario-tennis-ultra-smash-wii-u#game-details>
- Nintendo. (n.d.). *Wii U features*. Retrieved from <http://www.nintendo.com/wiiu/features/#>
- PlayStation 4. (n.d.). *Accessibility*. Retrieved from <http://manuals.playstation.net/document/en/ps4/settings/accessibility.html>
- QuadStick. (n.d.). *Home*. Retrieved from <http://www.quadstick.com/>
- Tobii Tech. (n.d.). *Apps*. Retrieved from <http://www.tobii.com/xperience/apps/>
- Tobii Tech. (n.d.). *Assassin's Creed Rogue*. Retrieved from <http://www.tobii.com/xperience/apps/assassins-creed-rogue/>
- Tobii Tech. (n.d.). *Tobii EyeX Controller*. Retrieved from <http://www.tobii.com/xperience/products/>
- Ubisoft Entertainment. (n.d.). *Just Dance 2016*. Retrieved from <http://just-dance.ubisoft.com/en-US/games/titles/just-dance-2016.aspx#tcm152221593-1>
- VTree Entertainment. (n.d.). *Practice Street Crossing*. Retrieved from <http://vtreeentertainment.com/Practice-Street-Crossing.html>



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