

## **Game Accessibility through Game Design and Community**

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**Abstract:** As video games become more popular, making games more accessible for people who play video games is necessary for the industry to move forward. Instead of relying on custom accessible controllers that can cost thousands of dollars, I propose ways game accessibility can be achieved through game design and the gaming community. I also investigate how software has been designed to be accessible and how crowd-sourcing information has been crucial to a more accessible world.

33 Million. That is the number of gamers with a disability according to AbleGamers' Inclusion Guide (2012). Game accessibility has been a problem since video games were conceived. Whether the controls are difficult to use or the graphics are hard to see for the colorblind, game accessibility has always been a concern. With the complexity of modern video games, there's more demand for game accessibility than ever before.

Traditionally, game accessibility has been achieved through the means of accessible controllers. The problem with accessible controllers is that each one is customized for the gamer they're given to and therefore, expensive. The AbleGamers Charity (2015) gives grants to gamers with disabilities every year so they can afford these controllers. However due to the high cost of controllers, AbleGamers can only give out so many grants every year. That's why AbleGamers prefers games to be accessible by design.

Obstacles for gamers with disabilities begin before they even turn on the game. According to Bierre (2005), purchasing a physical game at a store can be a hassle as some gamers with disabilities cannot physically bring a game from the shelf to the counter to buy it. Also on the packaging of the game, accessibility features are not mentioned. Often gamers will buy a game, realize they can't play it once they get home because accessibility features they need are not in the game, and so they'll have to return it. This is not a hardware issue, this is a software issue.

No matter how you look at it, hardware and charities created around game accessibility can only help a finite amount due to the volume of games and gamers with disabilities. This is why the best solution to the lack of game accessibility in the industry is games being designed

around inclusiveness, from the beginning. And this is exactly what AbleGamers is asking, for game developers to make their games accessible right out of the gate.

Some game developers are answering the call by bringing accessibility into their games. In a Global Game Jam, two game developers, Scott and Ghinea (2013), made an endless runner game inspired by CANABALT, Mini Free Runner. In Mini Free Runner, the player is running to the right of the screen endlessly like most games in the genre. A key difference in the game is before the player begins to fall down a pit, the game slows down to give the player a chance to jump out at the last second. This mechanic is part of the game's design and was put in specifically to assist gamers with slower reaction times so they can enjoy the game. While the game did not win the Global Game Jam, players of the game gave enjoyed it and noted how the accessibility feature was great, regardless of whether or not the gamer had a disability themselves.

Another game created with accessibility in mind is Access Invaders, a Space Invaders clone. The developers of the game added a unique feature called Player Profiles which, according to their Post Mortem (2006), allows for multiple players that play games multiple ways to play together. Profiles include a One-Switch mode which allows the game to be played with one button and Low-Vision which amplifies sound along with enlarging enemies. This game was designed from the beginning to be accessible to as many players as possible.

So what if a game was released to the public without accessibility in mind and down the road decided to implement accessibility features? For one game, PowerUp, a game where players learn and implement conservation techniques, this is reality. A small development team was contracted to make PowerUp more accessible (2008, October). The team surveyed gamers with

disabilities before implementing features such as revamped controls and more visual options. Gamers received these changes positively. The development team felt implementation would have been easier earlier in the game's development.

Terraformers, an atmospheric space game, was developed with one goal in mind, be accessible to blind gamers. By targeting a specific disability, the developers were able to go all out including abilities such as Sonar and a PDA to identify objects. The game uses 3D Positional Audio so gamers can rely on sound in addition to the graphics being rendered in High Contrast according to Westin (2004). The game was well received by critics for being a game blind gamers could play without compromise. The blind community loved the game and the game went on to win multiple awards in 2004 for accessibility.

I personally love game accessibility. In 2015 I created a start-up, Inclusive Games, a studio that creates engaging game experiences including those with disabilities. I noticed there was not a single game development studio out there that focused on making accessible games that can be enjoyed by anyone. Studios that primarily focus on accessible games often focus on one disability and the games they create are generally shallow. Seeing the need for game accessibility and better games made me decide to create a start-up to tackle both issues at once.

Inclusive Games' journey has been great so far. AbleGamers helped us get started by explaining how we can make an accessible game while still keeping our vision for the game. We also met with multiple successful start-ups and learned how to manage our business. Many people, whether or not they play video games themselves, believe Inclusive Games is a great idea and something that is needed in the industry. To be the founder of something this impactful truly means the world to me, both as a gamer and as a game developer.

In my experience as a game developer, designing a game with accessibility in mind from the beginning is the easiest way to ensure that the game will consistently stay accessible.

Interviewing gamers with disabilities on the genre of game I'm going to be creating, asking about obstacles that genre presents, helps give me a sense of what options I should include in my game so that my game is more accessible than the competition. Throughout development of my games, I always make sure to have playtesters to make sure my game is still fun and accessible.

Which leads me to another point, just because a game is accessible doesn't mean it's exempt from criticism. We need more accessible games out there to show accessibility is important for gaming however those games also have to be fun. Fun games that happen to be accessible are better for the industry than having extremely accessible games that are no fun at all to play. Game accessibility is a responsibility for a game designer just like fun is another responsibility.

One last aspect of designing accessible games I learned was to tell others what I'm doing. I initially didn't want to aggressively advertise my games to everyone I know but then the unthinkable happened. I was telling a group of game developers about my latest game along with its accessibility and they responded by mentioning how they never thought about making their games accessible. The group loved the idea of game accessibility and mentioned that they were going to go back to their games and add in some accessibility options. And I helped a few of them to make their games accessible on my own personal time just because I want more accessible games out in the world. By advertising my games, I'm also advertising the idea of game accessibility, which goes far beyond the games I'm creating. Inspiring other game developers to make their games more accessible is arguably as important as my own games.

The largest advocate for game accessibility is the gaming community. There is a website that highlights accessibility features in a game, Unstoppable Gamer organized by Brian Conklin (2015). Each review outlines accessibility information based around various disabilities along with reviewing the game's quality before giving a final aggregated score. While this website is a fantastic resource for gamers with disabilities, there are only so many games they can cover in a year. With multiple games released every week, it's impossible to get coverage on every released game as there's simply too many. If game accessibility information was included on the games themselves, then there would be less of an issue regarding whether or not a gamer with a disability could play the game.

One free service to label games was released last year as part of Valve Software's Steam Discovery Update (2014) for their Steam platform called Steam Curator. Steam Curator is a way for leaders in the gaming community to review games where reviews are then displayed on game pages. Potentially, accessibility reviews could be posted on Steam Curator so gamers with disabilities could know a given game's accessibility. Information can be crowdsourced from the community to allow coverage on a wide variety of games. Review space is limited for each review and along with "troll" reviews being primarily featured; it's fair to say there's a few obstacles in the way. Still, there's plenty of benefit to using Steam Curator and admittedly there's no risk involved.

Interestingly, playing games themselves can be crowdsourced. In games, sometimes sections appear that change the game mechanics, making an accessible game suddenly inaccessible for gamers with disabilities according to Porter (2014). While the ultimate is the game to be accessible in the first place, for games that have this problem, there's now an interesting solution. Playstation 4 can allow a player to stream their games online and in

addition, allow other players to play their game. So if a game section is too difficult, a gamer with a disability can simply stream their game online to have someone in the gaming community pass the section by using game Sharing functions as if someone in the room picks up the game controller from the gamer playing the game and starts playing themselves. Using this feature, games that are mostly accessible can be entirely accessible for those with disabilities, allowing them to experience games in their entirety.

This idea of crowdsourcing information for accessibility is not new to the world of technology. In web accessibility, there was a game called Phetch where players described images put on screen where their descriptions would then be turned into alt-text for images on websites, according to Von Ahn and crew (2006, April). mPASS, an urban accessibility mapping program, collects data on accessibility of cities from users. mPASS uses gamification to give incentive to users according to Prandi and crew (2015, September). Both of these technologies benefit those with disabilities thanks to the community.

Ultimately, game designers can create games that are fun and accessible, but the community is how those games are going to be recognized. If the community can champion good games because they're good and accessible, accessibility will be considered by more game developers. Game developers make games for gamers, and if gamers want accessibility, game developers will certainly add in those options.

The future of game accessibility relies on both game design and community. Game designers need to begin thinking about how game design can impact the future of game accessibility. What features can be added to a game to make it more accessible? Then the community needs to band together and ask for games to be more accessible. AAA game studios

aren't going to implement accessibility options if the community doesn't want them so voices must be heard. Thanks to charities such as AbleGamers and game development studios like Inclusive Games, game accessibility is being talked about more in the game industry so in time, our industry will be more accessible.



## **Annotated Bibliography**

*Welcome to Includification - Actionable Game Accessibility. (2012). Retrieved November 30, 2015, from <http://www.includification.com/>*

Includification is a website developed by AbleGamers that outlines accessibility for game developers. The website also states 33 million gamers have a disability.

*The AbleGamers Charity (2015). Retrieved November 30, 2015, from <http://www.ablegamers.com/>*

The AbleGamers Charity's website has multiple key points of information including statistics on accessibility. They also list they give out grants for gamers to get controllers to better play games.

*Conklin, B. (2015). Unstoppable Gamer - The Web's Number One Site for Gamers with Disabilities. Retrieved November 30, 2015, from <http://www.unstoppablegamer.com/>*

Conklin's website, Unstoppable Gamer, is a game review site with a twist; games are scored based on their accessibility in addition to their quality. This website is useful for gamers with disabilities as they can see whether or not a game is accessible before purchasing it.

*Steam Discovery Update. (2014). Retrieved November 30, 2015, from <http://store.steampowered.com/about/curators/>*

Steam Curator, a service created by Valve Software, allows for selected users to review games on the Steam service to be shown on the game page. This could be used to help knowledge of game accessibility.

*Yuan, B., Folmer, E., & Harris Jr, F. C. (2011). Game accessibility: a survey. *Universal Access in the Information Society*, 10(1), 81-100.*

This survey discovered that while game accessibility documentation exists online, these guidelines are not written for developers **by developers**. This creates a problem where the documentation only applies to specific instances and is not always helpful on guiding a game developer to implement accessibility options into their games. The guidelines also have difficulty being maintained therefore not guiding developers on how to make new game genres accessible.

*Westin, T. (2004). Game accessibility case study: Terraformers—a real-time 3D graphic game. In *Proceedings of the 5th International Conference on Disability, Virtual Reality and Associated Technologies, ICDVRAT*.*

An example of an accessible game by design. From the beginning Terraformers was made for blind gamers with multiple design decisions achieving this goal. The developers created a game in which the player has abilities to help navigate the game. These include Sonar that can identify

any object in the game, even having a PDA read out the object. There's 3D Positional Audio so players can rely on sound to play the game. Every object is also rendered in High-Contrast along with optionally being able to be rendered in 2D to further help players see the world.

*Bierre, K., Chetwynd, J., Ellis, B., Hinn, D. M., Ludi, S., & Westin, T. (2005). Game not over: Accessibility issues in video games. In Proc. of the 3rd International Conference on Universal Access in Human-Computer Interaction (pp. 22-27).*

An interesting point was made in the introduction that detailed the frustration some gamers with disabilities experience purchasing a game before even getting the opportunity to play it. Games are not required to put accessibility features on the packaging and also physically making the transaction of purchasing a game. Mods to make non-accessible games more accessible are discussed, for example, a mod was created for Doom 3 to add closed captioning in the game as it shipped without this feature. At the end, multiple questions on how to make the game industry more accessible are asked. An interesting question is the proposal of making a Game Accessibility Initiative for games akin to the Web Accessibility Initiative for websites.

*Grammenos, D., Savidis, A., Georgalis, Y., & Stephanidis, C. (2006). Access invaders: Developing a universally accessible action game. In Computers Helping People with Special Needs (pp. 388-395). Springer Berlin Heidelberg.*

Access Invaders is a Space Invaders clone made with accessibility in mind by having player profiles targeted for specific disabilities. There's a one-switch mode where the ship autofires and to change direction you press a button and a non-visual mode where the game is played entirely by using audio cues. The game is multiplayer and gamers with different abilities can play together cooperatively to take down aliens.

*Von Ahn, L., Ginosar, S., Kedia, M., Liu, R., & Blum, M. (2006, April). Improving accessibility of the web with a computer game. In Proceedings of the SIGCHI conference on Human Factors in computing systems (pp. 79-82). ACM.*

In web accessibility, there was a game created called Phetch where players described images put on-screen from the images. Their descriptions were then put in a database where the data could be turned into alt text for those images so people with visual impairments could use screen-readers to understand the images. This kind of crowd sourcing information could be used for game accessibility. What if people could tag games accessible or inaccessible regarding various disabilities and get rewarded for it?

*Scott, M. J., & Ghinea, G. (2013). Promoting game accessibility: Experiencing an induction on inclusive design practice at the global games jam. arXiv preprint arXiv:1305.4359.*

Participating in the Global Game Jam, two people took on the optional challenge in the jam of making an accessible game. Their game was inspired by CANABALT, an endless runner where

you jump to avoid death. Mini Free Runner is similar except before death, the game slows down to give the player a chance for a last-second jump. The game's accessibility is one example of a fun game being designed around a specific disability.

*Trewin, S., Hanson, V. L., Laff, M. R., & Cavender, A. (2008, October). PowerUp: an accessible virtual world. In Proceedings of the 10th international ACM SIGACCESS conference on Computers and accessibility (pp. 177-184). ACM.*

PowerUp is an online virtual world where players learn and implement energy conservation techniques in societies. A team was brought in to make the game more accessible. They surveyed people with various disabilities to determine which features to add to PowerUp. Overall the features implemented in the game for accessibility were received positively. The actual implementation would have been easier earlier in the game's development however no difficulty spikes were reported.

*Porter, J. R. (2014). Understanding and addressing real-world accessibility issues in mainstream video games. ACM SIGACCESS Accessibility and Computing, (108), 42-45.*

Mainstream games are still a long ways away from being accessible. Porter wants accessible gaming in mainstream games and wants more than just hardware solutions so he has conducted multiple research surveys on game accessibility. He also brings up an interesting point with an interesting solution. Often in games, even accessible games, there's small sections in the game where the mechanics change and present new challenges. Sometimes these mechanic changes can be impossible for gamers with disabilities. Porter wants a crowdsourced solution to allow people who can play these sections for other people who cannot pass them. The PS4 has this feature built-in, called game sharing, which is the first step to seeing this realized.

*Prandi, C., Nisi, V., Salomoni, P., & Nunes, N. J. (2015, September). From gamification to pervasive game in mapping urban accessibility. In Proceedings of the 11th Biannual Conference on Italian SIGCHI Chapter (pp. 126-129). ACM.*

mPASS, an urban accessibility mapping program, is an app that collects data on accessibility of cities from users. mPASS uses gamification to give incentive to users by giving them rewards for providing information. The result is an app that is useful to those with disabilities and benefits society as a whole by providing accessible places a space to be celebrated. This concept could also be used for game accessibility.