

Accessible Design

Strategies In Videogames Through Sound

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Abstract

Blind Accessible gameplay gives as many players as possible an opportunity to engage in playing videogames. While blind/visually impaired (VI) Gamers face obstacles when it comes to playing many mainstream videogames, the role of sound in aiding VI Gamers is gaining increasing attention in the game development community, referring to said games as “blind-accessible”. Blind Accessible meaning; “games that have blind or low vision accessibility”(Lexicon 2019). By examining the creative affordances of designing for blindness, game designers are able to create worlds of deeper immersive experiences for all gamers, VI and non-VI(mainstream) alike. This paper examines and classifies design strategies for how sound supports accessible gameplay in five games; ‘*Legacies*’(2021) by Ryan Gardner and Brian Fairbanks, ‘*Lost and Hound*’ (2020)by Brian Fairbanks, ‘*Blindscape*’(2013) by Gavin Brown, Nintendo 64’s ‘*Super Mario*’(1996) and ‘*Hellblade: Senua’s Sacrifice*’(2017) by Ninja Theory. In doing so, the research aims to ultimately inspire and inform game designers in creating more accessible immersive gameplay when these strategies are taken into account.

Keywords:

Videogames, Accessibility, Design, Blind, Visual Impairment, Blind Gamer

Table of Contents

Introduction.....	3
Why is accessible play an issue that concerns mainstream videogames?	
As designers of imaginative play, why not include this demographic of gamers and make our imaginative playgrounds accessible?	
Key questions asked during the course of research	
Hypothesis	
Contribution	
Literature Review	5
Theoretical Framework	8
Methodology	10
Discussion	12
Analysis of Accessible Design	
Design Strategies	
Accessible Game Design Elements	
Terminology Used When Referring to Gamers & Genres	
Conclusion.....	16
Summary of Design Strategies	
Appendix	18
Appendix A: Research Proposal’s Literature Review by Maeskye Trigg	
Appendix B: Anonymous play test feedback from 2019 MAGI Expo for Odyssey	
Appendix C: Anonymous play test feedback from 2018 Binaural Play experimental prototype	
References.....	19
Games References	
Statistics References	
Literature Review References	
Other References	

Introduction

Equity. As one of our basic human rights, as recognised by the Australian Human Rights Commission, it is important that we as creatives of imaginative play and escapism enable all with an interest in our creative spaces an equitable level of access to the experiences we offer. Equitable access in videogames allows gamers from all around the world to partake in otherworldly adventures of wonder, that would otherwise be impossible within our physical reality on earth. In design, equity is often addressed through notions such as accessibility, which then allows gamers of varying degrees of hearing, sight, cognition and speech to participate within the same activities as able-bodied or 'mainstream' gamers.

By identifying certain accessible design obstacles and creating affordances, game designers may discover new strategies in their processes allowing the creation of a potentially equitable play experience for VI Gamers in mainstream videogames. Additionally, this may also allow designers to access a problem solving and creative thinking rich environment for exploring new possibilities in immersive game design.

While the issue of accessible play is gaining more attention in industry, VI Gamers are still facing obstacles when it comes to playing mainstream videogames. Players are left with two options; adapt to the mainstream design focus using your own ingenuity or, remain locked out and play videogames only within the blind accessible and audio game genre spheres. The significance of this issue, lies within the numbers.

Why is accessible play an issue that concerns mainstream videogames?

"Of the world's population, [approximately] there are 246million people with low vision or are blind.

2.2billion of the world play videogames. 1billion of the 2.2 pay money for games, 13.2% of world population pay for games. Of the 246million, 6.5million english speaking blind people pay and play videogames"

-an educated assumption by Brian Fairbanks 2018 PAX Australia Accessibility Talk

In 2019 there was 7,713,468,100 people in the world's population(Worldometer 2019), and of the population 2.5billion or 32.4% pay to play video games(Wijman 2019). Meanwhile, the worlds population with a visual impairment(VI) equated to 2.2Billion or 28.5% of the world's population(World Health Organization 2019).

Borrowing Fairbanks' assumption that the percentage of people playing games in the world population can also be applied to the VI world population, we can then safely say that in 2019 approximately 713,038,535 or 9.24% of the world's population, are VI Gamers or have an interest in videogames. That's 9.24% who are potentially struggling to reach an equitable level of enjoyable immersive gameplay with choice in videogames as mainstream gamers.

As designers of imaginative play, why not include this demographic of gamers and make our imaginative playgrounds accessible?

By not incorporating accessible inclusivity in our videogame design practices, we run the risk of alienating 9.24% of the population. In addition, designers lose the opportunity to face certain design challenges that could lead to new levels in creative freedom and to new discoveries.

Key questions asked during the course of research

- + What can we, as game makers, do too open and enhance the playing experiences for VI Gamers?
- + How can we approach videogame design for broader accessibility?
- + What kinds of sonic feedback is required and desired by VI Gamers from the videogames they wish to play, to reach the desired level of immersive enjoyment and interactivity?
- + What level of immersion depth can be reached through sound alone?
- + Can there be a standard or guide for game designers to refer to during the design process?

Hypothesis

This paper will explore the hypothesis that there are unseen creative affordances by thinking about accessibility at the beginning of our game design processes. Leading to a problem solving and creative thinking rich environment for designers to play with ideas in. While ultimately lessening the financial burdens and time spent remedying game breaking bugs, as accessible 'features' aren't shoe-horned in after development. Rather, they are created as core mechanics and therefore implemented during the natural design process. By considering these creative affordances early on in the process, there is an advantage for both designers and gamers when design focuses on all senses, in particular our sense of sound. Thus, leading to a potentially equitable play experience for mainstream and VI Gamers.

Contribution

The contribution offered to the game designer field of practice are a clearly defined set of design processes, strategies and elements in the company of a theory that there exists three main spheres of immersion that can be linked to creating accessible design: Narrative, Visuals and Sonics.

Literature Review

In a world of technological advancement for where accessible game design is concerned, Visually Impaired (V.I)Gamers and accessible advocates are frustrated with the slow progression of advancement within the game development community. Accessibility is typically either added as a ‘feature’ or achieved by accident.

This literature review will explore the theories and practices suggested by respected accessible advocates and consultants. Paying particular attention to addressing the larger response from game developers, specifically about the *how* and *cost* of implementing accessible game design. While also highlighting *why* accessible design is beneficial for the gaming community as a whole, by *how* it has the added effect of deepening immersion while opening a path of inclusivity.

A common question that game developers and designers have about making their games accessible, is where to start? Early intervention and consideration for who the gamer audience may be will assist greatly in kickstarting the accessible game design process. Ian Hamilton’s research blog, *Prioritising Accessibility Considerations*, supports this where he states:

“...a good starting point is to set aside a little time in the early stages of development to think about the following high level groups, and what barriers your game might present to them. Even just a few minutes spent thinking about each will make a difference to how many people will be able to have an enjoyable experience with your game. Vision. Hearing. Cognition. Motor. Speech.”(Hamilton 2020, para. 16)

When considering these “high level groups” from the outset, game designers and developers may discover that the final financial and time costs to be much less, compared to if accessible design thinking were not implemented until the testing phase. *Extra Credits* place heavy emphasis on this in their video essay on ‘*The Curb-Cut-Effect*’. ‘*The Curb-Cut-Effect*’ is the effect when “[a design is done] to help the disabled, but they tend to benefit everybody.”(*Extra Credits* 2017) An example of this in the real world would be the literal curb-cut in the footpaths in our streets. Initially they are designed for wheelchair users, however they assist others such as parents with prams, delivery personal with loaded trolleys and even cyclists. Without the curb-cut, each one of these people would struggle getting over the footpath’s gutter. In relation to accessible videogame design, *Extra Credits* state that, “Nothing is simple or cheap in games if it wasn’t a design consideration from the outset”. In not doing so will definitely lead to costly dilemmas of one form or another. It could mean that after the initial round of testing, issues surrounding the accessibility of the game arise. Leading game development teams to; add to the initial development cost, shipping as is and thus preventing V.I Gamers from playing said game or a delay of the original release date. However, none of these outcomes are particularly sought after from any party. *SightlessKombat* offers a solution to resolving issues earlier on in the process, as described in his Winston Churchill Fellowship Report.

“...if you allow for gamers to test pre-release builds, the bugs you might be able to fix, or suggestions that might become a part of the final game, might not have necessarily been considered without the help of a [Gamer Without Sight].”-(SightlessKombat 2017)

When designers co-design through design problems by placing themselves in the perspective of their audience, and involving their audience as consultants in each phase, as suggested by SightlessKombat, designers are more likely to achieve a more satisfying outcome. Ian Bogost refers to this approach as, participatory design in his ‘*Why a Toaster Is a Design Triumph*’ article. Implying that by following this method in practice, enables designers to produce creations born of empathy for the end user.

“The designer’s job is not to please or comfort the user, but to make an object even more what it already is. Design is the stewardship of essence—not the pursuit of utility, or delight, or form. This is the orientation that produces solutions like the Breville “A Bit More” button. The design opportunities that would otherwise go unnoticed emerge not from what people know about or desire for toasting, but from deeply pursuing the nature of toasting itself.”

- (Ian Bogost 2017)

Brandon Cole(2014) further cements the notion that V.I consultancy should indeed be sought after when he shares his anecdotal experience playing ‘*Resident Evil 6*’:

“Positional audio, along with the occasional use of the auto-aiming Quick Shot feature, helps tremendously with shooting. Sound effects as each zombie is preparing to attack even allow the blind to counter properly. Yet, as lucky as all these things are, it’s clear it wasn’t made this way for the blind. That’s the way most accessibility in video games works. It’s by accident.”

-(Krefetz 2014)

‘*Game Maker’s Toolkit*’ video essay series, ‘*Designing for Disability*’ has an episode highlighting issues surrounding accessible game design for V.I Gamers, and offers some basic guidelines and best practices. Some of these guidelines cover accessible design considerations for V.I Gamers with colour vision deficiency, and offer warnings and advice for game designers on how to approach certain problems in communicating information to players.

“...avoid relying on colour alone when communicating information, or distinguishing between two different things. Designers should try to use shapes, symbols, shading, animation, and visual tricks to make critical parts of the game stand out from one another.”

-(*Game Maker’s Toolkit* 2018)

‘*Game Maker’s Toolkit*’ ultimately suggest one of two approaches when designing for colour vision deficiency: a) implementing symbols as part of the main gameplay in addition to the colours they represent or b) giving an option within the game’s menu to turn on a ‘colourblind’ mode, enabling symbols over colours to assist players. HUE, a puzzler colour swap videogame, is the prime example used by ‘*Game Maker’s Toolkit*’ to showcase how this may be implemented.

Meanwhile when designing for low vision players, *'Game Maker's Toolkit'* insist designers consider their game's contrast and text size. Stating that as a general rule, font size "should not drop below 28px for font in UI, and nothing below 46px for subtitles." Suggesting to add the option for players to resize text themselves within the menu. They highlight that both *'God of War'* (Santa Monica Studio, 2018) and *'Borderlands: The Pre-Sequel'* (Gearbox Software, 2014) are exceptional examples of how well a resizing option can be implemented without hindering gameplay. Especially *'Borderlands: The Pre-Sequel'* (Gearbox Software, 2014) where they went one step further, enabling the whole user interface to be scaled to the player's preferred size. While the *'Life Is Strange'* videogame series are another great example of accessible design. Where designers have integrated easy to read text on a dark contrasting UI background in-game, when the player interacts with different notes. By doing so they have granted the wider gamer audience of VI Gamers greater accessibility as it enables screenreader compatibility without hindering the level of immersion for all players. Another design point raised by *'Game Maker's Toolkit'*, is the use of an in-depth soundscape. Soundscapes are crucial to creating a deep immersive gameplay consisting a combination of foley, sound effects, music, character dialogue etc. *'Game Maker's Toolkit'*(2018) insists if a game's soundscape is designed well enough it "can be played by gamers who are completely blind, if soundscape is detailed and covers all important information." Important information such as audio cues telling players of their proximity to interactable objects, meter bars for combos or incoming hostiles.

The fact that there are still many games released with a lack of accessible design integration, or games with such poor attempts to be accessible friendly that leave all questioning why it was allowed to release in the first place. It begs the question for game designers and gamers alike; is there a clearly defined and unified standard guide to accessible game design thinking available, with a clear outline of accessible game design strategies?

Answering this question may ensure that accessible blunders such as *'DOOM's'* "colourblind mode", isn't repeated. Which instead of assisting colourblind players, *'DOOM's'* "colourblind mode" simulates how someone with colour vision deficiency would see the game normally.

Theoretical Framework

This research's theoretical framework has evolved from the theoretical practice of cognitive mapping through auditory cues, described in the research proposal's literature review (see appendix A), to the theory that sonics are only one piece to a larger puzzle that is accessible game design.

A selection of accessible design guidelines and best practices have been collated through the literature covered by accessible game design advocates and consultants, some of whom were noted within the literature review in the previous section of this paper. Guidelines and best practices such as involving VI Gamers and consultants within the design phase and creation of an in-depth soundscape to communicate information while enhancing the immersion of gameplay for all gamers. In addition, theories such as *'The Curb-Cut-Effect'* and Participatory Design have been paid particular attention when building up the theoretical framework of this accessible game design research.

By following theories of *'The Curb-Cut-Effect'* and *'Participatory Design'*, questions regarding creative affordances of designing for blindness, and creating worlds of deeper immersive experiences for all gamers, are addressed.

The effectiveness of how these theories answer the research questions can be measured by examining how they have assisted others within the field of accessible game design. Game and sound designer, Brian Fairbanks who is a respected figure among the Accessible Game Design Advocate Community, developed *'Lost and Hound'* by following these theories in his practice. *'Lost and Hound'* is a prime example that when affordances for designing games to be playable for VI Gamers are taken into account, the outcome is often rewarded with a deeper sense of immersion for VI and non-VI Gamers alike.

Designing for accessibility and doing so through means of *'Participatory Design'*, by involving other advocates and consultants in the design phase, creates a symbiotic relationship between accessible game design and immersive gameplay. By following the advice of accessible advocates game designers are likely to discover new means of enriching their narratives and interactivity through sonics when treating accessibility as a key element in game design.

Arguably, few mainstream games are developed with accessibility in the forefront of their design thinking, instead tacking *'accessible features'* on after the game's completion. Which can lead to costly game development bugs and a shallow depth of immersion for players with an in-cohesive gameplay with questioning levels of 'success' in accessibility, and therefore inadvertently excluding a vast number of gamers, VI Gamers. For example *'Overwatch's'* attempt of enabling a colourblind mode that rather than design an option for players to select alternative colours, shades or symbols it just placed a vivid filter across the screen that results in a more confusing a psychedelic play experience.

By following accessible design lead processes, game designers may not only find a whole new realm of creativity, but may also discover that previously perceived out-of-reach genres, such

as sandbox style videogames will become an enjoyable and engaging play experience for *all* gamers.

Game designers may find it useful to approach and answer the question of accessibility, by reviewing these three spheres of immersion (see Fig 1): Visuals, Narrative and Sonics. Rather than invent new methods of accessible play, this paper highlights the increased accessible playability of videogames when accessibility is considered the driver or essential element of game design and its effect on player immersion.

Methodology

This research has been built upon a combination of speculative research of analysis, followed by a practice-led method of testing analysis findings of implementing design strategies in conjunction with the theory of three spheres of immersion (see Fig 1) to discover and refine a standard guide for accessible design.

Speculative research of analysis was conducted through examination and classifying design strategies for how sound supports accessible gameplay within five games: ‘*Legacies*’ (2021) by Ryan Gardner, ‘*Lost and Hound*’ (2020) by Brian Fairbanks, ‘*Blindscape*’ (2013) by Gavin Brown, Nintendo 64’s ‘*Super Mario*’ (1996) and ‘*Hellblade: Senua’s Sacrifice*’ (2017) by Ninja Theory.

While the research’s practice-led approach was conducted through the design, development and testing of *Odyssey*, an RMIT Masters student research project.

A selection of accessible design strategies and elements, has been extracted through an examination of existing and emerging game design practices in mainstream and Blind Accessible videogames. Mainstream videogames such as, ‘*Hellblade: Senua’s Sacrifice*’ (2017) and Nintendo 64’s ‘*Super Mario*’ (1996) play and utilise their soundscapes to enrich their narrative aesthetics with the positive side effect of granting a realm of accessibility for VI Gamers.

While Blind Accessible videogames such as, ‘*Lost & Hound*’ (2020), ‘*Legacies*’ (2021) and ‘*Blindscape*’ (2013) use sound as a core means of interactivity and context driven by accessible design that ultimately enriches the immersion of narrative and gameplay. Through cross-referencing the findings of analysing both Mainstream and Blind Accessible designed videogames, the theory that there exists three spheres of immersion (see Fig 1) took form.

Identifying accessible design obstacles and creating affordances, through this analysis while referring to the three spheres of immersion (see Fig 1), game designers may discover new creative strategies for tackling their processes, allowing for a deeper level in immersive playing experience for both VI and Non-VI Gamers across the board.

‘*Odyssey*’s’ development looks at key accessible design questions and compares the limits and quality of accessibility between design core mechanics and features. Which was evaluated through a series of focus groups throughout its iterative design process. These focus groups were composed of anonymous volunteers who play tested each stage of iteration in ‘*Odyssey*’s’ development. Starting with an early prototype developed in 2018 that acted as a proof of concept for navigating unknown three-dimensional space through ambient sonics alone, titled ‘*Binaural Play*’. Play testing revealed that while users could form a basic cognitive map in their minds of the space, additional cues for the players were required to gain a confident level of explorative and immersive play. Cues that would enrich the game’s soundscape such as, a character’s interaction with the space: footsteps for different materials, breathing changes to

give information about the terrain and proximity warnings of dangerous areas and interactable objects.

Using case studies to analyse different videogames across both the mainstream and blind accessible genres, the research dissected what elements made each a different immersive experience, this is how the theory of *‘three spheres of immersion (see Fig 1)’* was conceived.

This is the theory of how there are three key elements of game design which interact, work and conflict with each other to communicate information to players and draw them into a rich immersive environment. The three key elements being: sonics, narrative and visuals.

Picture immersion as a cup of hot tea;

You have your Cup which is our narrative, the teabag that is your visuals and the hot water which is our sound. Making a cup of tea without any one of these elements could result in a cup of flavourless hot water, a cup with a dry teabag or a great big mess on the kitchen bench. Water is what most take for granted as it is unseen and plentiful, the same can be said for sound. However, combine all three and you, the drinker, can enjoy that calming hot cup of tea. This is what makes up the *‘three spheres of immersion (see Fig 1)’*.

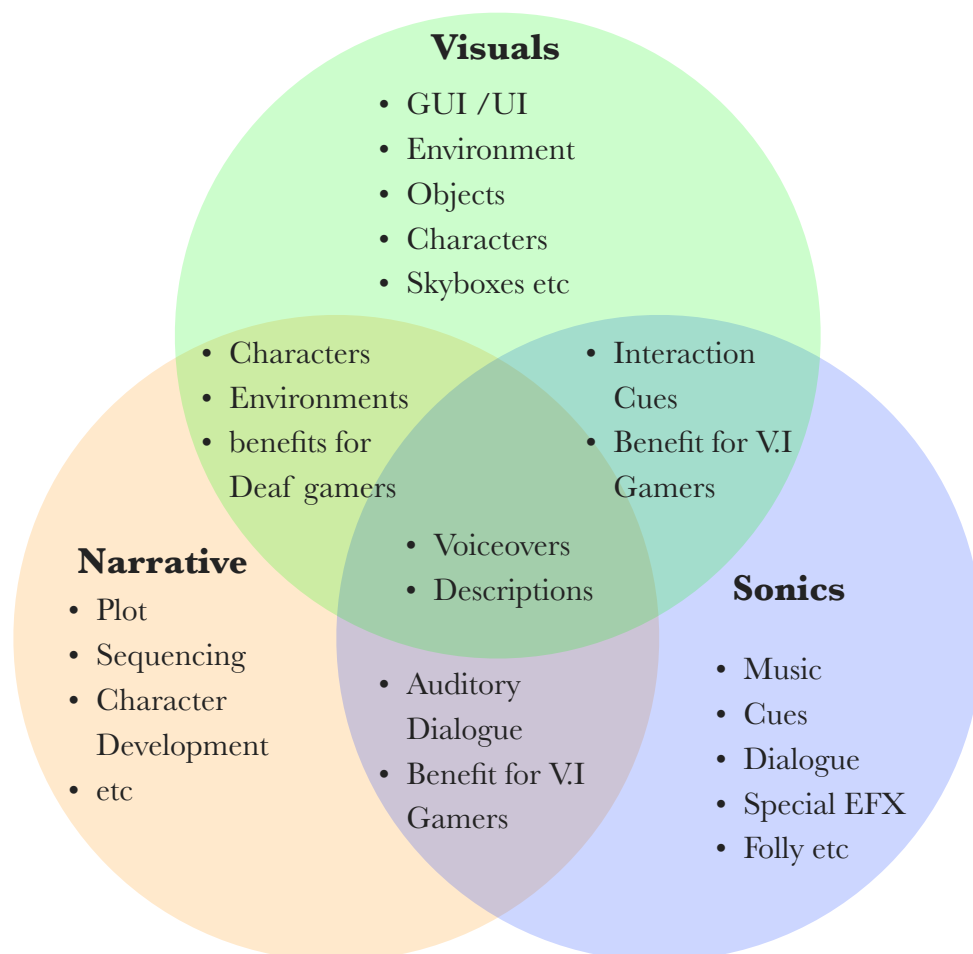


Fig 1: Diagram of the three spheres of immersion

Discussion

The Research findings show that through detailed analysis and experimentation, a core set of design strategies and elements were generated. Which can then be used to the benefit of game designers in making their videogame blind accessible and for gamers everywhere to enjoy.

Analysis of Accessible Design

Before design of ‘*Odyssey*’ could proceed, analysis into how others within the accessible game design field of practice achieved accessible play was needed.

‘*Legacies*’(2021) by Ryan Gardner and Brian Fairbanks, is an underwater, stealth, mainstream accessible game with a message of oceanic conservation. Players roam as an activist submarine with the aim of protecting the ocean and its inhabitants from destructive human activity. ‘*Legacies*’ accessible design is heavily situated within the realm of sonics, using auditory cues in sonar to inform the player of incoming threats, changing in pitch for the sub’s submersion depth, direction and proximity to the ocean floor. The in-depth soundscape of the sub, ocean and interaction cues grant VI Gamers a deep sense of agency and immersion, while also granting that same sense of uninterrupted deep immersive gameplay to mainstream gamers with beautiful graphical scenery.

‘*Lost and Hound*’(2020) by Brian Fairbanks, is another exquisite industry example where accessible game design has been at the forefront of the game’s design process. Enabling this new release to be included among the mainstream accessible game genre. In this scenario the player takes on the role of a sniffer rescue dog, named ‘*Biscuit*’. Players are required to locate missing persons and items and in some cases return items to the correct owner through Biscuit’s sense of smell. Which has been implemented through manipulating the games soundscape within the player mechanics. Players can make ‘*Biscuit*’ ‘sniff’ the ground for scent, quieting the larger ambient sounds and separating the objective’s audio source, enabling the player to zero in on and locate the objective as they approach.

"Scent is represented by a low, pleasant humming sound on the ground, and like scent tracking in real life, it is INVISIBLE. Picture making your way through a maze, but the walls are removed and the way out is invisible and represented by sound. Due to this unique gameplay mechanic, this game is fully accessible to blind gamers (and they generally seem to excel at playing, moreso than sighted gamers)." - Brian Fairbanks(2020)

‘*Blindscape*’(2013) by Gavin Brown, an iOS audio only game that combines narrative and sonic output to communicate information to the player. Spending no more than fifteen minuets to play start to finish, ‘*Blindscape*’ is a beautiful example of how auditory dialogue can be used to convey story, context and interactive feedback to the player. Player’s play as a man who’s savagely lost his sight, and join him on his journey of escape from his dystopian home. Tapping the screen at intervals in the storytelling to open doors, locate and climb ladders and secret passages to escape. However, this is by no means ‘simple’. This is an audio *only*

gameplay and there are specific locations and ship movements needed to be made on your iOS device to successfully resume the story. Failing to find interactable objects such as a door knob, lead to the character crying out in pain or frustration on each attempt, communicating to the player to try again. One may argue that while enabling accessibility, the trial and error method pulls the player out of their sense of immersion.

'Legacies'(2021), *'Lost and Hound'*(2020) and *'Blindscape'*(2013) are all games that have been designed with VI Gamers in mind as their core target audience. However, there are mainstream videogames out there that also contain accessible elements, though granted these accessible elements most likely did not emerge from an accessible design lead process, they are still worth analysing for why they work so well as accessible games for VI Gamers.

Nintendo 64's *'Super Mario'*(1996), starring the popular plumber gamers have all come to know and love since the 1990s is one such example of accidental accessible play. Why? It has an in-depth and repetitive soundscape! Enabling players to learn cues for upcoming dangers such as Goombas and pits, stage changes, power-ups and user interfaces. Nintendo 64's *'Super Mario'* soundscape was designed to be playful and energetic, but it's unique audio cues for every in-game element also gave it the benefit of also being accessible to VI Gamers.

Meanwhile, though not quite to the same extent as Nintendo 64's *'Super Mario'*(1996), *'Hellblade: Senua's Sacrifice'* (2017) by Ninja Theory also has auditory elements in its design that could be seen as approaching accessible in some specific scenes. Players are given the ability to 'focus' within senua's surroundings, similar to *'Lost and Hound's'* scent tracking mechanic, the player can hone in on items of interest or avoid dangers without relying too heavily on visuals. However that is the extent of accessible content in *'Hellblade: Senua's Sacrifice'*(2017), it has so much potential to be more. However scenes involving visual illusions and cues that aren't translated into audio have prevented it in being so.

Design Strategies

As videogame designers, we collectively strive to open our worlds of imagination to as wide an audience as possible. Designing with accessibility as the core element in the forefront of our process allows designers to do just that. It is important to note that no two people with the same visual impairment diagnosis will experience it the same way. Therefore, a blind accessible designer may consider design requirements for gamers on the Colour Vision Deficiency spectrum (colour blindness), Light sensitivity, Glaucoma, short sightedness, long sightedness and so on.

Design questions that could be referred to, to assist design decisions from the perspective of sonics:

1. Regarding menus and title screens:
 - 1.1. Is the text displayed, readable for screenreader software?

- 1.2. Is the player's use of a screenreader necessary, is there a builtin voiceover for text, highlighted menu buttons and selections?
- 1.3. Do menu layouts follow a clear, non-complex and low click-economy format, could someone of low to no vision navigate with little to no frustration?
- 1.4. Are distinctive audio cues used to assist players in understanding where they are in navigating menus and their layouts? Are Voiceovers and Descriptive audio utilised?
 - ie. "game Title" > "Main Menu" + Menu Music > *menu buttons appear* "Play?" > *player navigates to next button below* + audio cue of rolling off and onto another distinct button "Options?"> *player selects the highlight 'options' button* "Options!" + audio cue of button selected.
2. Regarding Graphic interfaces such as HUDs and GUIs:
 - 2.1. Enable customisable options to scale the screen size of HUDs and GUI elements for VI Gamers.
 - 2.2. Enable options for Voiceovers and Descriptive Audio to be used.
 - 2.3. Enable the ability to change the font size of text that appears on screen.
3. Regarding interaction in game space:
 - 3.1. Enable Audio Cues
 - 3.2. Enable the ability to 'Focus' on certain audio sources
4. Regarding Navigating unknown 3D virtual spaces:
 - 4.1. incorporate Proximity Warnings
 - 4.2. Incorporate Corrective Pathfinding mechanics
 - 4.3. Use an in-depth Binaural Soundscape

Accessible Game Design Elements

1. Customisable Options

This includes adjustable options for graphics, volume and user interfaces and of font scaling for readability.

2. Focus

'Focus' is an ability that allows the player to hone in on a point of interest. In both a visual and auditory manner, allowing players with low vision to pin point an objective or object's location. Which they may lock onto, feeding into the 'Corrective Pathfinding' mechanic.

3. Proximity Warnings

'Proximity Warning's are where upon the player collides with restricted zones in game space and objects of interest, will result in an audio cue accompanied by

player character dialogue. e.g “*That’s a giant eagle, I wonder if it will let me on its back?*” or “*This cliff edge has a good view of the meadow.*” By doing so, this allows the player to understand their surroundings and what they may interact with.

4. Voiceovers(VO)

Audio dialogue that reads out text upon the screen or assists in highlighting UI.

5. Descriptive Audio(DA)

Audio which describes an object, scene or screen to the player(s).

6. Audio Cues

Audio which notifies players of interactable objects in menus and game scenes with unique identifying sounds. e.g ‘wha-wah-wah’ sound of ‘*Pac-Man*’(Namco, 1980) moving.

7. Corrective Pathfinding

‘Corrective Pathfinding’ is a feature that players may use to assist in locating an objective or point of interest. When they deviate from their course, the player character will provide instructive dialogue. e.g if the ‘Focus’ was locked onto a birds nest by a river the dialogue may be; “*I need to head towards the river.*” Players will then listen and locate the river through directional audio.

8. an in-depth Binaural Soundscape

This is a layering of all audio within the game and how different audio types enhance and interact with each other within a three-dimensional space. Binaural meaning directional audio. Soundscapes account for menus, ambience, folly, special effects, music, dialogue, cues etc.

Terminology Used When Referring to Gamers & Genres

Term for games that only have colour blind accessibility= Colour-blind accessible games

Term for games that have blind or low vision accessibility = Blind accessible games

Referring to games that are for both blind and sighted players= Mainstream accessible games

Referring to gamers who are blind or have vision impairment = Blind gamers, Audio gamers and VI Gamers.

“VI Gamers is the best answer. It’s not clumsy, like people first language is. It is inclusive: including low vision, blindness and milder types of vision impairment.”

-Brian Fairbanks(Lexicon 2019)

Conclusion

Questions that arose through the course of the research undertaken from 2018 to 2020 have all been answered. Following the analysis of existing audio games in 2018, to understand how audio games had been designed and devised a prototype experimenting with binaural audio. (See Appendix C for feedback from play-test).

Leading to further research on accessible videogames and other accessible platforms in, and the ideation of ‘*Grandma’s*’ in late 2018. ‘*Grandma’s*’ was to be a three-dimensional exploration, blind accessible game further exploring the theory of the ‘*three spheres of immersion (see Fig 1)*’ by investigating all elements that are encompassed within each sphere. However this was then superseded by ‘*Odyssey*’ in 2019-2020, in an effort to downscope for the student project that it was. Choosing to instead focus more on one of the spheres, the sphere of sonics. (See Appendix B for Feedback from play-test).

By combining equal amounts of Sonics, Visuals and Narrative designers create and merge the ‘*three spheres of immersion (see Fig 1)*’ that will draw players in. Throw in gameplay and the controls that have had accessibility at the forefront of their design, you can then open up your virtual playground to a wider demographic of players who will become more involved. Benefitting not only game designers, but V.I and non-V.I Gamers too.

Summary of Design Strategies

Regarding menus and title screens remember to consider enabling options for screenreader software compatibility, keep layouts short, simple, and concise with a low click-economy with distinctive audio cues.

Regarding Graphic interfaces such as HUDs and GUIs, consider customisable options to scale the screen size of HUDs and GUI elements for V.I Gamers. Including the ability to change the font size of text that appears on screen. Ideally for UI font, no less than 28px and 46px for subtitles.

Regarding interaction in game space consider enabling Audio Cues and the ability to ‘Focus’ on certain audio sources to assist in locating objectives or items.

Regarding Navigating unknown 3D virtual spaces consider incorporating a combination of Proximity Warnings, Corrective Pathfinding mechanics and use of an in-depth Binaural Soundscape.

For all of these Design Strategies, also consider using voiceovers and descriptive audio too. In most cases one might suggest having this as one of the pre-ticked on options, allowing non-V.I Gamers to turn off if so desired. Each Strategy aims to inspire and better accessible levels in game design for V.I Gamers while also enriching the immersive experiences videogames have to offer to all.

Designers may find comfort in now knowing that a clear guide of accessible game design strategies and elements concerning sonics now exists. Game designers and developers may

wish to take this research further, to test the limits, push boundaries and explore new means of integrating accessible play through immersion.

Human rights advocates, often state that a person should have equitable access to their society and communities to which they belong. To deny an individual access to due to their impairment, is to be abhorrently discriminatory. It is therefore for this reason that this research implores game designers to '*up their game*' by looking beyond the charted territory of standardised game design, and to instead consider the power provided by inclusion of accessible design thinking.

Appendix

Appendix A: Research Proposal's Literature Review by Maeskye Trigg

Appendix B: Anonymous play test feedback from 2019 MAGI Expo for Odyssey

Appendix C: Anonymous play test feedback from 2018 Binaural Play experimental prototype

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