



SMASH
CLAY
AUDIO

Breaking the Sound Barrier:

How Game Audio Can Improve Accessibility

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Smash Clay Audio / AbleGamers

INTRODUCTION

- **Talk covers:**
 - What is game audio, who can benefit from accessible audio, and methods and challenges in making games more accessible.
 - **About me:**
 - Sound designer with a passion for accessibility – heard about game accessibility at PAX 2013 from AbleGamers; color blind filters in *World of Warcraft*
 - Looked at blind-accessible games available:
 - Found lack of mainstream blind-accessible games
 - Blind-accessible games by community had poor sound / audio games by sound designers weren't accessible
 - Need people with technical backgrounds who are passionate about accessibility and can promote conversation between gamers and developers
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RESEARCH

- Learned from theses, conference talks (CSUN, AES, NAMM, GDC), accessibility meetups, NFB & game conventions, Abilities Expos, conversations with friends & the blind community
- Learned from involvement with blind-accessible indie games:
 - *Frequency Missing* – currently dialogue & script editor for English translation
 - Per Anders Östblad: “Audio-Driven Gameplay”, GDC16
 - *Earplay, Steno Hero, Sight Unseen*
 - Not developer, but rather accessibility consultant
 - Tested for screen readers, audible info needed by players, express player orientation through sound, etc.

RESEARCH CONT.

- **Great part:** In these games, I was able to see these ideas in action.
 - Why I want to help as many accessible games get out there:
 - They show accessibility methods in an attractive way—which is the best way to inspire developers (second to giving personal stories)
 - Help developers get off “square one” through collaboration and foresight, and solve the tale of the sighted developer who says, “Wow, an accessible game? Cool! I want to make one! It’s going to be so new and revolutionary... wait, what is VoiceOver?”
 - Developers who understand what is possible with accessibility and audio are more likely to succeed in creating high-quality blind-accessible games
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TAKING ABOUT ACCESSIBILITY + GAME AUDIO

- What is game audio?
 - Sound effects, ambience, music, and dialogue
 - **Purpose:** make games more realistic and immersive, enhance the emotion
 - Won't be talking in terms of these four elements
 - Will be talking about sound in terms of:
 - **Instructional, Locational, Emotional** sound
 - **Warning:** screen readers, though audible, are not in sound designer's control, though I will be talking about them
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POPULATIONS BENEFIT FROM AUDIO

Visual aspects:

- **Blind:** 39 million (WHO, 2014) – For purposes of talk, I will be talking about people who are blind and low vision separately, though blindness is a spectrum

Text (can see UI, location):

- **Low vision:** 246 million (WHO, 2014)
- **Aging:** more than you'd think, 27% of gamers are 55-64 in EUR / 50+ in US (2016)
- **Dyslexia:** 6-17% of world population (UNAM, 2011)
- **Second Language (outside scope of talk for time):** almost 500 million people for English and Spanish alone (British Council, Cervantes Institute, 2015)

Control volume of certain sounds:

- **Autism and Sensory Processing Disorder (SPD):** Autism: 1% of world population (CDC, 2014) SPD: 5-16% of children (UCSF 2014)

AUDIO'S ROLE IN GAMEPLAY

- Talked about **what is game audio, who benefits from audio, and role of audio in games** (realism, immersion, emotion).
 - What is audio's role in gameplay?
- **Initial issue:** Since UI and game designers are visual thinkers and because audio focuses on realism, immersion and emotion, audio in games is often limited to aesthetic information
- But if we approach audio similarly to UI design, by focusing on **user control, user memory loads, and consistent interfaces**, then we can translate visual information audibly—this is key to accessible audio

ACCESSIBLE GAME AUDIO FEEDBACK CONT.

- How do we do this?
 - First, players need answers to certain questions:
 - “What should I do?” – Instructional gameplay info
 - “Where am I, and where should I go?” – Locational gameplay info
 - Though more aesthetic and gameplay info in abstract way, don’t forget:
 - “What should I feel?” – Emotional info
 - These three types of audio information can help us break down accessible audio
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Though I want to talk about my whole approach, the frameworks that inspired it, and how each population is affected, due to the 30 min time limit and the fact most people just want to know the practical application, I had to cut it out.

PRACTICAL USE: INSTRUCTIONAL INFO

“**What should I do?**” - Instructional info

Purpose: Help players learn game with audible text, icons, and actions

- **Text:** Menus and tutorials need to be read by screen reader/voice actors:
 - *King of Dragon Pass, Skullgirls, Choice of Games* use text-to-speech (TTS)
 - *Grail to the Thief, Frequency Missing* use voiced menus
- **UI:** Icons need to be audible whether verbally or with symbolic sound.
 - **Approach - Verbal + symbolic sound:** Teach with spoken text, and once UI sound is memorized, remove text (or allow shortcut to access spoken text)
 - *Hearthstone:* trading card game, cards have a picture and description, but once description is memorized, the picture is all that's needed for player to make a decision.

PRACTICAL USE: INSTRUCTIONAL CONT.

- **Actions:**
 - Use easily recognized repetitive dialogue / SFX:
 - *Mortal Kombat* and *Injustice*: limited hit, punch, kick and yelling sounds that are unique to each character
 - *Overwatch*: ultimate abilities have only friendly/enemy versions
 - Limited variation allows faster memorization, immediate confirmation of player's action, and promotes quick reactions (reflects UI concepts of user memory loads, consistent interfaces)
 - Have range of SFX: *Overwatch*, characters have unique footsteps
 - Have customized player experience: *Overwatch*: game audio mixed by threat level instead of realism—sounds from enemies are more noticeable than sounds from teammates

PRACTICAL USE: LOCATIONAL INFO

“Where am I, and where should I go?” – Locational info

Purpose: Make sure player orientation is clear and that they can confirm their location and direction whenever they need to.

- **Simulated acoustics:** Use detailed positioning with (nerd stuff like) 5.1 imaging/Atmos, HRTF, obstruction, occlusion, reverb, etc. to show location
 - However, physics-based reverb models and detailed positioning aren't complete answer—player needs to know direction instead of just location
 - For some games, it doesn't have to be that complicated: *Mortal Kombat: Simple Stereo panning* lets players know not only where they are on screen (2D platform) but also which side of enemy they're on

PRACTICAL USE: LOCATIONAL CONT.

If direction is the issue, how do we show it?

- **Sound Cues:**
 - **Adaptive music:** change when going wrong way or when approaching an enemy (used in many games)
 - **Assisting characters:** *A Blind Legend*, *Dishonored* have people you follow
 - **Sound beacons:** *Papa Sangre*, *Sight Unseen* have sounds you follow, avoid
 - **Memorable SFX:** In dungeon crawlers, doors could be unique
 - **Memorable ambiences:** In *Silent Hill 2*, I got lost but I realized I was going backwards because I remembered the ambience
 - **Experimental:** Digital white cane (*Gone Home* mod), sonar (*Alien: Isolation*), “right/wrong” footsteps when walking on linear path

PRACTICAL USE: LOCATIONAL CONT.

- **Verbal cues:**
 - **Cardinal directions:**
 - *Swamp* (zombie shooter audio game) has shortcut for “North, East, South, West.” Could even use Northwest, etc.
 - **Audio description of environments:**
 - In *Frequency Missing*, the narrator describes the room when you first walk in
 - **Object descriptions from touch-activation:**
 - Phone & tablet screen readers, will say what is underneath your finger as you touch the screen—used in *Frequency Missing*

PRACTICAL USE: EMOTIONAL INFO

“**What should I feel?**” – Emotional info

Purpose: Player should not be distracted from task or caused unintentional anxiety.

- **Relaxing Music/SFX:** (for gamers with autism/SPD)
 - Music in *Civilization* helps concentration, many puzzle games
- **Audio sliders:** (for gamers with autism/SPD)
 - Allow players to remove sensitive sounds and “reintroduce” them later
 - *Pit People* has an additional slider UI sounds
- **Audio description (AD):**
 - Describe character expressions in cut-scenes
 - Not used in AAA games, but AD is in all Netflix originals and Pixar films

CHALLENGES

Screen Readers:

- Sighted people hate screen readers—but personal assistants—Echo Dot, Google Home—and driving apps might change that
- Lack of in-game screen reader support on consoles
 - Lack of in-game screen reader support in popular engines
 - Lack of screen reader-accessible clients or online stores
- Consistency: Developing for TalkBack isn't the same as for VoiceOver
- Text-to-speech, though an audible function, is not sound designer's job

Other option – Voice actors:

- Voice actors are expensive—could raise budget, depending on amount of text

CHALLENGES CONT.

Audio Sliders:

- Hard to standardize – sounds triggering SPD are different for everyone

Audible UI:

- Repetition can be annoying
- UI sounds can be hard to memorize
- Expectations for UI sound are far behind graphical user interface (GUI)
- Sound designers don't control UI design

Location:

- Realistic sound doesn't mean accessible sound

GENRES THAT CAN BE ACCESSIBLE NOW

- Instead of tackling all games, focus on games that allow once choice at a time and give player enough time to make an informed decision.
 - **Point and Click Adventures:** *Frequency Missing*, games by Telltale (no QTE)
 - **Turn-based Strategy Games:** *Pokémon*, *Persona*, *Final Fantasy* series (need fully spoken dialogue and combat, audible navigation)
 - **Trading card games:** *Hearthstone*, *Pokémon TCG Online*, (would likely need keyboard support, no time limit)
 - **Side-view fighting games:** *Mortal Kombat*, *Injustice*, *Skullgirls* (audible tutorials, voiced menus, no quick time events [QTE])
 - **Interactive story games:** *Her Story* (with TTS), stories for Alexa & Earplay
 - **Visual novels:** *STEINS;GATE*, *Narcissu* (need voices, screen reader)

NON-AUDIO-BASED SOLUTIONS

- Blind-accessibility isn't only dependent on audio
 - However, these solutions also assist those with mobility, hearing and intellectual disabilities, too
 - Tweakable font sizes
 - Haptic feedback (Rumble Paks)
 - Use for gameplay info, not just “whoa, you're in a helicopter”
 - Tactile enjoyment by gamers with autism
 - Allow player to slow game down
 - Auto-assist, VATS
 - Keyboard accessibility
 - Skippable quick time events
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THOUGHTS

- Accessibility is **not about limiting your creative vision** but removing unintentional “**designed disabilities**” so more people can play
 - Don't sacrifice accessibility for immersion's sake
 - **Have more than one way to access gameplay information**
 - **Look at new technology: VR, personal assistants, voice recognition**
 - **Tech blind gamers use:** screen readers, white canes, smart glasses, Braille devices (bring into game world)
 - **Look at UI design:** user control, user memory, and consistent interfaces
 - **Get feedback from gamers with disabilities** – don't pretend closing your eyes makes you blind
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WHY CONSIDER ACCESSIBILITY?

(Wish I could give talk just about this)

Gamer quality of life:

- Games promote technology independence / job skills
- Job placement in games industry (blind programmers)
- Social interaction, inclusion, and ability to relate
- Give chance to experience higher-level cultural expression and Art in games
(*Papers, Please*)

Tech advancements:

- Game accessibility makes games better for everyone

Company benefits:

- Reach more people
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Thank you to everyone who is making blind-accessible games and to my husband for helping me get this under 30 minutes

Bibliography and further reading: Resources page on www.smashclay.com

Upcoming blind-accessible games: *A Hero's Call, Frequency Missing, Earplay, Steno Hero, Sight Unseen*

Other a11y games mentioned: *Swamp, A Blind Legend, Grail to the Thief*