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Integrating Audio in the Isometric Game
Understanding interactive 3D audio in isometric games

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Abstract
This study is about audio design for the isometric perspective computer game. Many games have an isometric perspective also known as a top-down perspective. Audio plays a large part in modern computers games. In this thesis I have questioned how audio is used in isometric games and if it is possible to implement positional audio in isometric games, which is mostly used with true perspective games. Through an analysis of how three dimensional audio is used and how audio is designed in true perspective video games, I have attempted to find out how audio can be implemented and designed for video games with an isometric perspective. A discussion in audio design has been formulated based on a game called Magicka Wizard Wars, where I have analyzed and theoretically written how audio implementation would be designed for that specific type of game and what potential problems could occur.

Keywords: Isometric, Attenuation, Perspective, Three dimensional

Abstrakt

Nyckelord: Isometriskt, Attenuation, Perspektiv, Tredimensionell
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1 Introduction

This thesis is about audio design and development for video games with an isometric perspective. I have chosen to write my thesis from a theoretical point of view where I have taken works from different professional audio designers and researchers combining them into one study. During the time this thesis was written I participated as an intern studying game audio with game developers Paradox North, where they were currently working on an isometric multiplayer game. Their game inspired me to base a lot of my study on what I have learned working with them.

1.2 Aim

The aim of this thesis is to document and analyze audio design implementation techniques used for isometric video games, which can be used in further studies and information on the subject. A large part of the audio implementation research is based on a project called Magicka Wizard Wars by game developers, Paradox North.

- The aim of this thesis is to study implementation of 3D audio for isometric video games.
- Study how audio can be used as a part of the game and give the player information.
- Discuss different facts, theories and problems linked to audio design for games with an isometric perspective.
- Gather research about isometric audio that can be used in other studies and or other game developments.

1.3 Background

To fully understand how audio is used in a game with an isometric perspective I first need to discuss what the term isometric means and how it is applied in video games.

Throughout this thesis I will compare the isometric perspective with a true perspective called a first-person perspective, as seen in figure 2. In order to understand the differences between
perspectives and how audio is effected I will refer to figures and research for the first-person perspective even though this thesis is about audio for an isometric perspective game.

A game with an isometric viewpoint means that the camera is placed above the game level and is slightly rotated, giving the game more depth, yet keeping objects in perspective to size which visually generates a larger area to see (Knudsen, 2012). The term isometric and the use of the word in video games may not always refer to the true isometric perspective, which is an angle at precisely 60 or 120 degrees to each other and an angle of 30 degrees from the horizontal, and is commonly used to describe any top-down camera (Giant Bomb, 2013). A true perspective video game means the camera is placed either where the characters eyes would be (called a first person perspective) or behind/around a character (third-person perspective), creating a viewpoint with a more realistic perspective and distance in the game. See figure 1.

Most games with an isometric view are strategy games. “In games of this genre, the player usually assumes an abstract god-like position to control a simulated world seen from above. The objectives of such games can be manifold, but most commonly include successful expansion of territory, dominance over enemies or accumulation of a certain amount of a given item (credits, minerals, or even inhabitants). Depending on the nature of the game, special strategic, tactical, political, diplomatic or trading skills are required to varying extents.” (Weske, 2000).

Game audio is generally designed to simulate sound as it would be in real life, which is based on the human ear and how we perceive sound. We hear in stereo which means that we can hear which direction sound is coming from using our left and right ears. We can also hear what is in front and behind of us and how far away the source of the sound is. The same effect can be implemented in video games using three dimensional (3D) audio parameters that control the volume and pitch depending where the sound source and listener is (Donkers, Stoop, 2003). If we look at a video game with an isometric perspective theoretically our ears would be hovering over the level and we would experience audio heard from below, which means that if an isometric games audio design was to be as realistic as the first-person perspective, the whole audio experience would be heard from a distance. However that is not the case, in fact most of
the audio experience is faked in an isometric game (Rippy, 2004). The audio is heard as if the player is right in the action even though what we see is happening from a distance.

The theory is that hearing audio from an isometric view creates a different perception of the soundscape compared to audio from a first-person perspective game. Theoretically audio for isometric games should be more even-sounding with the larger perspective, meaning that there is a larger soundscape, i.e., more sound to hear in the picture (see figure 1, left). Objects in isometric games constantly stay the same size due to the perspectives angle (see figure 2 top) which means there is no perception of distance, unlike a true perspective where objects increase or decrease in size depending on their distance in correlation with the players position (see figure 1, right). Since there is no depth in isometric games, how the volume corresponds with distance (e.g. things in the distance have a lower volume) cannot be used in the same way it is used in a game with a true perspective.

Figure 1. Example of two games, left, an isometric perspective and right, a first-person perspective.
1.4 Definition of isometric

Pronunciation: /ˌɪsə (ʊ) ˈmɛtrɪk/

adjective

1  Of or having equal dimensions.
2  Physiology relating to or denoting muscular action in which tension is developed without contraction of the muscle.
3  (In technical or architectural drawing) incorporating a method of showing projection or perspective in which the three principal dimensions are represented by three axes 120° apart.
4  Mathematics (of a transformation) without change of shape or size.

Origin:

Mid-19th century: from Greek isometria 'equality of measure' (from isos 'equal' + -metria 'measuring') + -ic
(Oxford dictionary, 2013)

“Isometry is equality within measurement. What this means, is that in any isometric representation, all measurements are to scale, no matter how far close or how far in the distance they are in view. In an isometric perspective, you have a 3D view where, no matter where you are in that space, the object scaling retains its value and doesn't change. Conversely, in a true perspective, objects reduce in size as they recede into the background. Because of this lack of perspective scaling in isometric perspectives, they provide a way to represent a 3D object in 3D space while maintaining proportions and hence making it reliably measurable (for the most part).” (Senocular, 2012)
1.5 Research Question

How can audio be implemented and designed for video games with an isometric perspective?

- Are there different rules for audio design and implementation for true perspective and isometric perspective video games?
- Can three dimensional audio (also known as positional audio) be used in a game with an isometric perspective?
2 Previous Research

My research will be based upon articles with professional sound designers and facts based on proven methods from audio middleware programs. Due to the fact there is very little previous research on isometric audio I will widen my field of research and research three dimensional audio (3D audio) which is mostly linked to audio for games with a true perspective.

2.1 Audio in Games

The first documented video game with digital audio was called Nutting Associates made in 1971 (Collins, 2008, pg.2). The first game that used a primitive form of 3D audio was called Wolfenstein 3D made in 1986. But only in 1998 was 3D audio used to its full potential in Half-Life (Weske, 2000). The first known game with an isometric perspective and with audio is the Sega arcade machine Zaxxon made in 1981 (Lauppert, unknown date). But either than that little is documented about 3D audio for isometric games or audio design in general. 3D audio is used in an isometric game called Magicka Wizard Wars developed by Paradox North and therefore is a valued argument that 3D audio can be used in isometric games.

Just like designing the way a video game looks and plays, you need to design how it sounds. Audio plays a large role in modern games and is used to create the appropriate atmospheres and tell the story of the game.

“Audio must work in concert with graphics and game mechanics to help immerse the player into gameplay experiences of all shapes and sizes through its ability to convey vast amounts of the detail to the player, often without their knowing”. (Bridge, 2012)

Game audio is basically a large part of the game experience and can be used as a subconscious information source for the player. That is why it is important to keep the soundscape clean by not implementing too much audio in the game which will create imbalance and confusion and also potentially make the audio too thick. Larry the O, a professional sound designer, states;
“making sure key sounds and moments can be heard in the game is important but it is also important make sure that they fit into the audio environment and be a part of creating a balanced soundscape in the game” (Larry the O, 2000).

Nowadays most games are three dimensional, where objects in the game are created as 3D models using computers and can be seen from any angle in the game. The use of audio can also be in 3D thus called positional audio. A 3D sound is basically a sound with a parameter for the shape and distance of how the audio behaves in the game and a attenuation which controls the volume according to the distance within the parameter which is usually a sphere (see figure 3). Because of 3D audio in video games you can go up and down or around a sound, you approach it and you pass it, and depending on the size of the sounds parameter you can hear the sound even after you pass the audio source and it’s out of sight (White, 2000).

2.2 Use of audio in isometric games

Isometric games have a completely different perspective than first-person shooter games which uses a true perspective. The vantage point is higher and wider, you’re looking down on the action from above. The higher perspective means that you have to fake a lot of the audio. “Given that you are high up, you wouldn't hear a lot of swords clinking against things, but we put it in there anyway.” (Rippy, 2004, pg.58). The perspective make objects in the game all the same size which means the use of parameters is limited and the larger vantage point means there is more to see at once. Audio design becomes more of a challenge.

“You're dealing with a couple of dozen little characters on the screen at once, so finding a balance between hearing general mayhem and been able to identify what you’re selecting and, ‘Is this thing responding to what I'm telling it to do?’” (Rippy, 2004, pg.58).

Depending on the style and the way an isometric game is played, the way audio is used may vary.
“Accordingly, the main use of sound in games of this genre is to inform the player of certain situations or conditions as well as to furnish the simulated world with matching acoustic fragments of ongoing events and thereby making it more appealing to the player.” (Weske, 2000).

Audio is used to help tell a story and make game play more understood by enhancing what we see with sound. For example using dialogue and text to describe game play or creating an alarm sound when something important is happening. This type of audio is informative audio and can be used in a variety of ways (Jørgensen, 2008). A different approach is audio used as an effect, basically to enhance what we see but with little meaning behind it which is called effect-full audio. But nowadays there is more processing power in computer games which allows audio to be used more to its full potential (Henein, 2007). In most games there are combinations of the two where the informative audio is placed in front of effect-full audio which is layered more in the background of the game. That can be accomplished with the use of three dimensional audio, (Brandon, 2008). However in games with an isometric perspective, 3D audio is not typically used the same ways it is used in games with a true perspective.

“The way sound is used in strategy games is fundamentally different from action games. Since the world is seen from a top-down perspective, 3D sound spatialization is not normally applicable, though stereo-panning may be used to draw the player's attention to events taking place in an area left or right to the currently displayed window of the playfield.” (Weske, 2000).

How audio is designed depends on the type of game. Like Weske states above, 3D sound spatialization is not normally applicable in isometric strategy games and the way sound is used in strategy games is fundamentally different from action games. However, during my research I discovered that theory may not apply to all types of isometric games.

I have analyzed two different types of isometric games. Generally audio for isometric games can differ, you have the true isometric strategy games which have a god-eyes perspective where the player controls the world the game is based in, or the multiplayer online battle arena (MOBA) type of isometric game where the player controls one character that fights in a team with or
against ten other online characters. The audio for those two games is different as well and how 3D audio is used can differ as well. Two examples of isometric games that fit those profiles are Age of Empires and DOTA 2.

The god's-eye perspective is a concept used where the player is a force that acts upon the world of the game rather than a force within the game that then acts on the objects and actors of the game from within (Laurie N. Taylor, 2002). Age of Empires is the type of isometric game with a god's-eye view perspective, along with many other games such as, SimCity, Sid Seier's Civilisation and StarCraft. The game is played from a distance and the audio is simulated from a distance at a consistent volume almost making the audio sound like ambience creating a two-dimensional sound. Therefore, 3D or positional audio is not completely applicable, like Weske states, although certain aspects of 3D audio such as stereo panning and attenuations can be used in such games.

As I have analyzed, in games such as Age of Empires you basically hear what you see. As soon as the player interacts with objects such as buildings or armies in the game by clicking on them audio will be trigger for that particular object at close range. Age of Empires uses its audio very informatively, every click and action will give you feedback with the use of audio. A few examples of how audio is used in this game is, when you select a character or an army they will give you feedback with sound, either by saying “what is your command” or “what is your plan” and then notify you and say, “I'm on it” when you interact and command an action. Your characters will notify you with audio when an enemy is nearby or when there is a mission to complete, for example saving civilians. Selecting objects will also play unique sounds depending on what the object is and the role it plays in the game, for example selecting an important building. That type of use of audio means that there is no need to hear exactly where the building you are clicking on is, due to the fact that the audio is triggered at close range regardless of its distance and position, ruling out use of 3D audio, although stereo panning can be used effectively.

In DOTA 2 however the type of game play is more intense, the notion of the gods-eye view disappears because instead of controlling a world you control one character. Even if the
perspective is isometric and the game is seen from a distance you hear the audio as your character would, which means in 3D.

Positional audio can be implemented, although you do get audio feedback when selecting your character and giving it a task, similar to the audio in a game like Age of Empires. But since the game play is more multi-player online battle arena (MOBA) than real time strategy and the only thing you have to focus on is your single character. There you can hear approaching enemies and determine their position before they enter the players field of view with the use of 3D audio.

2.3 3D audio implementation

How audio works in games depends on the type of video game and what tools are used to make the game. Generally audio is triggered in the games scripts. Most game engines have audio-tools or use audio middleware, where game audio can be implemented and mixed to create the desired effects.

Audio is rendered though the audio listener in the game out to speakers or headphones.

“A listener represents a microphone in the game. A listener has a position and orientation in the game’s 3D space. During game play, the coordinates of the listener are compared with the game object’s position, so that 3D sounds associated with game objects can be assigned to the appropriate speakers to mimic a real 3D environment.” (Wwise, 2013).

The audio listener is almost always positioned at (0,0,0) or in the center of the display by default (Heikkinen, 2012). Game objects or audio sources use attenuations and parameters that control the audios volume and velocity, (See figure 3.1) which then with help of the audio listener creates positional audio.

“Positional audio uses the position of your audio sources and the position of the listener to determine how to mix the sound to the speakers. An audio source on the left side of the listener would be louder in the left speaker, and vice versa for the right side.” (Heikkinen, 2012).
An attenuation works by using two radiuses, a maximum and minimum radius which enables sound to higher or lower depending on player and the sound’s origin, where the sound’s volume is at 100%. When the player moves away from the sound’s origin the volume will lower depending on the size of the radiuses which is measured in distance. Pass outside the radius and the volume will be 0% (Wwise, 2013).

Figure 3. Example of an audio parameter and sound source form an isometric perspective.

Figure 3.1. Example of an audio parameter and sound source form a first-person perspective.
2.4 Conclusion

In isometric games, due to the special perspective, 3D audio cannot always be used the same way as it is used in video games with a true perspective of first-person perspective (Weske, 2000), which in turn means that there is less dynamic range to work with or none at all. Because of this, the overall volume of the game audio stays at a constant level in volume, therefore creating the problem of audio becoming very thick if too many objects are playing audio at the same volume all at once (Rinard, 2007). The biggest problem with designing any form of game audio is the fact that the audio is non-linear, meaning that at any given point the audio can change.

“It cannot be known ahead of time what a player will do at any given moment, so you can't really premix all the elements of the game's sound in perfect relationship to each other. In fact, any point within the game may sound different given the variables. For example, a player may be in a quiet room all alone at one moment, then activate some machines or other noise making objects, then be attacked by enemies.” (Larry the O, 2000).

This means however, that there is little control over how much audio will be played at once. For example, at one point there may be nothing in the scene that makes a noise but then all of a sudden an army enters and consequently a lot of noise is made, which is very common for the isometric type of game.

In isometric games such as SimCity or Age of Empires the audio is used for a different type of strategy game. Most of what is heard through the game is ambience, sound heard from the god's eye view. The camera is placed above the world and instead of having one character you control a number of characters and actions in a larger area. The audio takes a more observant role in such games and is therefore played from a distance. Only when you interact with objects by clicking or hovering over them will audio be played at a closer range to indicate that you are interacting with them.

A sound designer has to take into account that the player may remain in the space for only a few seconds or hang out for 15 minutes. That means that audio needs to remain interesting for a long period of time (Larry the O, 2000). Audio needs to vary slightly to keep it interesting. Isometric
games have a larger field of view which means objects and events will be shown for a longer period time even if the player is just running through the area.
3 Approach

In this chapter I will test implementing 3D audio into an isometric video game. I will change listener positions and attenuation settings and document how the audio is affected to clarify my statements.

![Figure 5. Screenshot from Magicka Wizard Wars.](image)

Magicka Wizard Wars is a game which is currently in its late stages of development, developed by Paradox North. The game is an online player versus player strategy game with an isometric perspective. The game’s audio is in an early stage of development which means most of the audio is used as a placeholder (i.e. audio will change when the game is released) and therefore can be freely changed and tested on. Together with Paradox North I have been able to test and implement the game’s audio extensively. I have also been able to identify problems that may occur in the game audio that are linked with typical problems with audio for isometric games. This study became a part of a production which resulted in some useful information about audio design for isometric video games.
The programs I have used during my mode of procedure include; a game-engine called Bit Squid and Bit Squids audio tool called Timpani.

3.1 Mode of procedure

Positional audio uses the position of the listener and the position of audio sources to determine how the audio will be rendered out to the speaker’s appropriately. Since the isometric perspective looks down on to the game world, I wondered how the placement of listeners would affect how the audio is rendered.

In Magicka Wizard Wars the listener was placed on the player’s character which meant that the audio was rendered from the characters position. I first tried to place the listener on to the camera thinking that the audio would be rendered from a distance due to the fact that the listener would be placed up in the sky in the 3D world. Although that is possible by changing different positional coordinate values for the listener in the game code, it resulted with the placement of the listener remaining where it was. Instead of the player’s character being the listeners position, (i.e. meaning that when the character moved the listener would be locked and move with the character), the listener instead became locked to the camera and would follow the cameras movement. This is due to the fact that the listener has coordinate value of 0 in the elevation axis, thus the listener remained at ground level in the game. However, it explained how the audio was rendered for a number of games, for example isometric games such as League of Legends and DOTA 2, where the camera can be freely moved in the game level where the audio is rendered accordingly to the cameras position.

In most isometric games the perspective is locked and only has one point of view. That means that if the listener is placed on the character, the audio may be rendered incorrectly. If the character is able to turn its back to what is been seen in the game and on screen, the listener will rotate and render the audio form the characters perspective resulting with, audio sources coming from the right of the screen will be rendered to be heard from the left speaker. Although in Magicka Wizard Wars this is prevented by locking the listener in and preventing it to rotate with the character, keeping the audio placement correct.
How the listener detects audio sources and renders the audio accordingly is by the audio sources having attenuation properties which the listener constantly reads and renders. By default, making the attenuations smaller made everything more than a few meters from the player quieter. I could change the attenuation properties (i.e. distance the volume starts to fade and how fast with an X-Y scale) which affected how far away audio could be heard and how. Making them larger, approximately the size which is seen on screen with a sub linear falloff point (see figure 4) sounded most natural for the type of game, although that depended on which sound was triggered and how it was used in the game. Sounds such as spells cast by the player, and other players in range, are benefited from the sub linear fall off where audio remained approximately the same volume with a slight decrease whilst players are in view, and then decrease sharply in volume as soon as they ran out of view. Other sounds such as ambiance and a few select sounds such as larger spells, called magicks, sounded better with a normal linear fall off. I noticed that since there is background sound and music it didn't really matter if smaller sounds were always heard, or not, whilst in view.

In Magicka Wizard Wars there are eight online players divided into two teams, battling against each other. All players battle in one large area where at one given moment, players can be spread

Figure 4, Attenuation with a sub linear fall off point.            Figure 4.1, Attenuation with a linear fall off point.
throughout the whole area or be gathered up in one large group at a particular point in the area. This in turn means that the audio has to be designed so that one particular player can hear approaching enemies or team mates before they enter that player’s point of view, but also limit the amount of audio which can be heard from the other seven players in the area, according to their distance from the main player. To achieve this, volume attenuations are normally applied to the audio sources in the game (see chapter 2.3 for more information about attenuations). I noticed whilst testing how attenuations affected the audio, that even though attenuations may only seem to affect the volume (and in some cases pitch) of objects in correlation with their position to the listener, that was not the case. In Magicka Wizard Wars, depending on how I changed the attenuation properties and size, the audio was affected in different ways. I could use attenuations as a form of limiter for the audio in the game.

By making attenuations larger or smaller I could separate the audio that was in view for the player with the audio that was not in view, in a similar way a term called “diegetic” and “non-diegetic” audio is used. Although in this case the term diegetic audio means that, audio which is heard from physical events in the game is diegetic. Non-diegetic audio is, music, narrative dialog and other forms of audio which are heard but have no physical link to what is been seen on the screen. “Everything which happens inside this world is called diegetic and what happens (in the movie) outside this world is called non-diegetic” (Klas Dykhoff).
4 Result and Discussion

In this chapter I will use facts and findings I have come across in the previous chapters which I can link to my research question and summarize this study. I will also write about problems and results I encountered with Magicka Wizard Wars.

4.1 Audio design for isometric video games

Like audio for any game, audio for isometric games will be used and adapted to the type of game. It is the perspective that makes the isometric games audio design unique. Due to the top down view and lack of true perspective, objects in the game always appear to stay the same size no matter where they are placed (i.e. close up or far in the distance). Like Rippy states, “Given that you are high up, you wouldn't hear a lot of swords clinking against things, but we put it in there anyway”. (Rippy, 2004). Unlike video games with a true perspective, where objects close up are in focus and objects in the distance are smaller and less in focus.

The same principle applies to the audio in true perspective video games. Sounds in the background become part of the ambience leaving space for objects in focus to be heard, which are closer to the player. The isometric perspective flattens the perception of distance meaning that objects in the distance appear close up and are just placed to the left or right of the screen.

Rippy writes about how there is usually a lot of small characters to deal with in isometric video games, therefore it is important to find a balance between what is happening on the screen with the use of audio. Generally audio is used to amplify effects and create emotions. It is also used as information where audio can be used to warn, inform and notify players (Jørgensen, 2008).

The isometric perspective increases the area to see, and more objects can therefore spread out over the game level and be shown at once (See figure 1), which results with creating a larger soundscape. That means there is more to be heard. However if there is a lot happening in the game and all objects that are seen can be heard at the same volume no matter how close or far they are, there is a large chance that the audio mix will become thick. The problem with audio
becoming thick is that the soundscape can become confusing and uncomfortable to listen too (Rinard, 2007). This is why thick audio is avoided.

Weske writes, “Since the world is seen from a top-down perspective, 3D sound spatialization is not normally applicable” (Weske, 2000). Not every isometric game is the same, the perspective can be used in numerous different types of games and depending on the type of game, the audio will have to adapt. Meaning there is not true rule for how 3D audio can be implemented in isometric games.

Weske also writes about most isometric video games been strategy games, where the player controls a number of different objectives in the game and is not just a single character. Such games like Age of Empires or Sim City 4, where the camera is placed far above the world and instead of having one character you control a number of characters and actions in a large area. The audio takes a more observant role and is designed to be heard from a distance. Only when you interact with objects by clicking or hovering over them will audio be played at a closer range, to indicate that you are interacting with them. In these types of strategy games, Weskes statement that 3D positional audio is not typically used, can be understood.

However there are different types of isometric games like mentioned. Such games like, League of Legends, DOTA 2 or Magicka Wizard Wars which are Player verses Player online games. The player controls one character in a large arena with a team of three or four other online players, against another team of four or five online players. In this type of game the camera is often set closer to the level. Due to the fact that the player only controls one character and the game play if closer and more intense, 3D audio is fully applicable.

Finding balance for audio in the isometric game can be quite a challenge. Getting the audio to sound even and fit into what's happening on screen without it becoming too much or too little. Both Larry the O, Bridge and Rippy talk about how balancing the audio is the key to designing audio for any game, but creating that balance is especially hard in isometric strategy games due to the unique perspective. “Audio should be in concert with graphics and game mechanics”
(Bridge, 2012). He also states that audio should be in harmony with what is happening in the
game and should be used as information for the player, even without their knowing. In all types
of video games, judging how long a player may remain in an area is difficult. It is also difficult
to judge how mush audio will be triggered at any given point in the game. According to Larry
the O, a player may enter a room and only remain there for a short period of time or linger and
for example, trigger a number of machines which will suddenly start making a lot of noise. So
premixing all the elements of the game's sound in perfect relationship to each other is near
impossible.

4.2 Audio design for Wizard Wars
There is possibly a problem with how this Magicka Wizard Wars is designed and how the audio
is affected. In the game there are eight characters which are wizards that can cast a range of
different spells. The characters are able to constantly cast spells without and any cool down time,
(i.e. normally in this genre of video game, characters have a limit to how many times they may
attack an opponent) which means that any number of spells can be cast repeatedly by any
character. Not only does every character share audio events, which means all characters sound
exactly the same causing the variation of sounds to become limited. This can cause a very messy
and incomprehensible soundscape. Although, due to the fact this is how the game has been
designed, there is no link to the isometric perspective causing the audio to behave like this in
particular.

Magicka Wizard Wars is designed to be played between five and ten minutes and is meant to be
at a very high tempo, however there is a line between high tempo audio and messy audio. Ideally
you would want the audio to be high in pace but still orderly to prevent confusion. A good
example of a game with high paced audio is an online multiplayer isometric game called League
of Legends. The type of game is quite similar to Magicka Wizard Wars, although they are two
completely different games mechanically. I wanted to find out how the audio is controlled in
League of Legends and if there was any way the audio techniques form that game could be used
in Magicka Wizard Wars audio. I soon realized however, that by the way the spell systems in the
two games worked and how different the games worked mechanically it would be very unlikely.
In League of Legends there are ten different characters, five on each team. Each character is an
individual that has their own set of sounds. This already means the audio can be told apart and that the same sounds will not be triggered a large number of times, throughout the time the game is played. Also in League of Legends, spells have a cool down period which means after a player casts a spell it will take a number of seconds before the same spell can be cast again. That means just the gameplay itself acts as a limiting source for the audio. Compared to Magicka Wizard Wars where there are no cool down periods after spells, the audio cannot be controlled the same way. Although audio can be controlled by changing how the sound is heard for different parties, (e.g. when throwing a rock at another player the sound you hear when your rock hits the other player will differ for that player who has been hit by it), creating two sounds; being hit or hitting someone else. This creates clarity and will give audio feedback when the player has been attacked or is attacking. The same principle can be used when casting spells, it will sound different when you hear other players casting the exact same spell you just cast. That means the players sounds will always be distinguishable from the other online players sounds. Jorgensen writes that audio is used to clarify events in the game. With the use of signals when bases are being taken or lost, and how many spawn points each team has left, the game play can be clarified with the use of audio.

As mentioned before, the game uses one set of sounds that all of the characters share, which means that the audio is the same for every character. This in turn allows the same sounds to constantly be triggered any number of times by all of the players, which causes the audio to become extremely unbalanced, and like Larry the O, Rippy and Bridge state, balance is important! Typically you would limit audio so that the number of times a sound can be triggered won't be played more times than allowed. Though the problem is that even if the audio for certain spells are limited for each player and their character, the same sounds can still be triggered by everyone else casting that particular spell within the hearable area for the player (i.e. within the volume attenuation area), meaning there is no true limit for audio. This in turn causes the audio to become very hard to follow, you do not know where sound is coming from and everything tends to become one big solid mess of sound. This game is chaotic. There are eight players; anybody can kill anybody with an unlimited amount of spells in one large space where there is constant action and explosions. The audio is very unpredictable, one moment you may be running around alone and the next there are seven other players shooting at each other. Every
single spell needs to be heard and at the same time the players want to hear what's happening with their own characters. Nevertheless, audio design generally has to adapt to the type of game. If the game is played in a very high tempo and there is a lot happening, then the audio will typically behave the same way due to the fact the audio is interactive and is triggered by events evolving in the game.
List of words

Ambience noun: The character and atmosphere of a place: the relaxed ambience of the cocktail lounge is popular with guests

Developed noun: A person or thing that develops something: a property developer, software developers

Dynamic adjective: (Of a process or system) characterized by constant change, activity, or progress: a dynamic economy Music relating to the volume of sound produced by an instrument, voice, or recording.

Falloff noun: Definition: slacking off; gradual decrease

Implementation noun: The process of putting a decision or plan into effect; execution: she was responsible for the implementation of the plan

Limiting noun: A point or level beyond which something does not or may not extend or pass: the failure showed the limits of British power

Linear adjective: Arranged in or extending along a straight or nearly straight line: linear movement. Mathematics involving or exhibiting directly proportional change in two related quantities: linear relationship

Perspective noun: [Mass noun] the art of representing three-dimensional objects on a two-dimensional surface so as to give the right impression of their height, width, depth, and position in relation to each other: the theory and practice of perspective

Pitch noun: [Mass noun] the quality of a sound governed by the rate of vibrations producing it; the degree of highness or lowness of a tone: her voice rose steadily in pitch
Randomizing **verb**: [With object] (Usually as adjective randomized) **technical** make random in order or arrangement; employ random selection or sampling in (an experiment or procedure): *a randomized, controlled study of 62,000 women*

Range **noun**: The area of variation between upper and lower limits on a particular scale: *the cost will be in the range of $1-5 million a day grand hotels were outside my price range* the compass of a person’s voice or a musical instrument: *she was gifted with an incredible vocal range*

Velocity **noun** (*plural velocities*): The speed of something in a given direction: *the velocities of the emitted particles*

**References**


**Images**

Figure 1, Screenshot, Starcraft2 and far cry 3

Figure 2, Isometric Perspective, www.kirupa.com

Figure 3, Screenshot, www.unity3d.com

Figure 4, Screenshot, Timpani, Bitsquid www.bitsquid.com

Figure 5, Screenshot Magicka Wizard Wars, www.wizardwars.com