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Active listening, interaction and immersion.

An analytical proposal on the creation and reception of soundscapes in video games.

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ABSTRACT

The following article addresses the field of soundscapes based on the creation of environments in video games. Theories spanning sociology to audiovisual media thereby converge around a topic that is by nature transmedial. The first section will consider several ideas to define the concept of *soundscape in a video game* in order to analyse its parts and, as a result, to better understand the morphology of the sound design. Continuing with the theoretical framework, the term "immersion" will be explored, thus establishing a clear connection between immersion and the sounds of the environment present in this reality.

The second part of the article develops an analytical model for sound environments that allows us to reflect on acoustic design characteristics such as technological evolution, sound aesthetics, and the transmission of information. This all leads to the idea that immersion is not based on realism or state-of-the-art development but on creating a sound design according to game aesthetics, and that its purpose is to capture the player's attention.

Introduction

Due to their multidisciplinary nature, soundscapes can be the object of analysis in many kinds of environment. Thus, we find diverse investigations ranging from how a particular place might have sounded in the past to how someone identifies the sound that surrounds them. It can therefore be deduced that wherever a sound construct is present it can be studied. This brings us to video games, electronically created objects involving an interactive activity and which offer the player immersion in their virtual universe. These elements make video games an optimal resource to observe how sound plays a fundamental role in fulfilling this function. This research therefore results from combining concepts found in sound studies, music-audiovisual language theory and video game studies.

The article suggests that video games can be studied by taking the design of their soundscapes as a starting point. This means specifically focusing on the field of sound design and how the work by sound technicians contributes to creating the internal identity of the video game on the one hand, and the way in which players receive the information on the other, which contributes to their immersion within the virtual reality of the game itself. It is precisely this process from a video game's conception to its reception that will guide this dissertation on sound.

This being the case, the very nature of sound with respect to the internal culture of the video game will be analysed first. Issues such as the presence and significance of sound sources will be dealt with in this section, taking as reference authors such as O'Keeffe (2011) and Huiberts (2008; 2010) in order to address how virtual realities are constructed from sounds. In the same way, the presence or absence of sound sources invites us to apply the theory of sound classification developed for previous works (Maldonado, 2018). Through an analysis of the sound sources of a specific place, we can classify these sources based on their acoustic characteristics, their continuous or occasional presence within the space, or the importance of a given sound in configuring the sound and cultural identity of a particular territory. Hence, transferring this classification to the virtual environment of a video game will help us to distinguish sound sources and obtain as much information as possible. Even though this first section presents an analysis of the sound with the intention of cataloguing, it serves as a theoretical basis for a subsequent discussion of the differences between sounds of a different nature and how these influence the player's perception.

Second, and taking into account the resulting concepts, an analysis will be carried out from the player's point of view. It is important to add that a reasonable argument must include discussion of diegesis, the spatial positioning of sound and how this affects sound reception, and that the IEZA (2008) model will be followed for these analytical processes. In this framework, each quadrant is designated as a category of sounds for the purpose of classifying, and thereby analysing, the sound sources of a video game and their semiotic implications. The model developed by Ermi and Mäyrä (2005) to differentiate between three types of immersion and explain the relationship between them based on the player's expe-

rience will also be used. This reflection on immersion allows us to understand how a virtual environment is capable of capturing the player's attention.

Based on this, one of the objectives of the following research is to correctly assimilate the concepts of the theoretical framework in order to prepare a proposed analytical model based on the sonic relationship of three elements: intention to listen, interaction and immersion. The justification for this proposal is to provide an understanding of how different sound configurations can be decisive when it comes to causing an effect on players, aside from the strictly musical spectrum. Unlike other analytical models, the one presented here works through a comparative process that allows us to reflect on the morphology of the non-musical sound space and the implications for the player's immersion. By advocating a comparative practice, possible aesthetic patterns in sound creation can be represented in a more visual way and the technological evolution that defines and influences sound simulation studied.

Lastly, the application of this analytical model will be exemplified through a series of video games from different periods. The purpose of examining various temporal spaces is to understand how technological limitations are not only defined as those that aesthetically and functionally configure sounds, but also those that influence the state of immersion achieved by the player.

Soundscapes in video games: conceptualizations

Before addressing the main topic of this research, it is imperative to clarify the object of study. In a production-based classification of game audio, three types can be distinguished: voice, sound and music (Brandon, 2005, p. 24). In this article we will address the second category –sound effects– from studies of soundscapes.

At this point, we should clarify the concept of soundscape that will be employed. On the one hand, the adjective "internal" will be used, since only sound sources that come directly from a game will be considered, leaving aside any other external sources the player might be able to hear (sounds from their own home, voices, sounds from outside that may enter their gaming area, etc.). Although these external sources are very important in terms of the degree of the player's immersion (O'Keeffe, 2011), they are not part of this research since, as mentioned in the introduction, it centres on the internal production of audio within the video game itself.

Moreover, the area of interest addressed in this article is the socio-territorial concept of soundscape, and so the music will not be taken into account either. Far from detracting from the amount of auditory information available for the analysis, being able to study the sound and the music separately should facilitate a deeper comprehension of the tripartite relationship between sound, the visual aspect and reception. One reason for this is that by eliminating the musical layer of an environment, the acoustic morphology of a virtual space can be analysed more clearly and other aspects seen in more detail, such as reverberation,

filters or the compression through which a sound passes within the space. Another reason for this separation of music and sounds is that the semiotic functionality of sound sources remains much more latent and classification is therefore easier.
Although this relationship between the sound and the visual aspect is most often addressed from the perspective of musical sources – for example, Chion (1997) and Pavis (1996) – the resulting conclusions and reflections on functionality can be applied to the non-musical sound spectrum. This has been explored by Jiménez and Rodríguez (2015), who explain how the functions of music within video games – devised for audiovisual media but extrapolated to video games Gértrudix (2003)[1]– are perfectly applicable to the remaining sounds since the aim is to introduce the player to a specific scenario and achieve a greater degree of simulation. In this way, both music and other sound sources serve the same purpose and may therefore share the same functions. Along the same lines, Chion (1997, p.15) has shown how sound can add meaning to the visual format, so we conclude that sound is a fundamental part of the development of a video game for both the setting and the narrative.

Nevertheless, although the above emphasizes the importance of the sound spectrum, video games – like many communicative, playful and artistic expressions – are profoundly ocularcentric[2]. On this, authors such as Bull and Back would say that "the epistemological state of hearing has been in a poor second place compared to that of vision" (Bull et al 2015, p.1). One way to easily appreciate the supremacy of the visual elements is to consider that, if they wished, the player could easily deactivate all sounds, whereas removing the images would make the game unplayable. Still, from a pragmatic perspective this differentiation between the visuals and the sound is not negative but a way to more accurately understand the role that sound plays. Although less crucial than the visual aspects, it is important to remember that sound is capable of adding value to action in conjunction with images, which allows us to reflect on deeper aspects such as environment design or narrative construction. Tonkiss would suggest that vision is spectacle while sound is atmosphere, and argue that sound offers us a sense of depth and perspective (quoted in O'Keeffe, 2011, p. 52).
Adams (2006) sees soundscape as a construction through which players must navigate, suggesting the importance of creating an appropriate setting in a video game. Certeau (1988) complements this, arguing that the ability to navigate through this space depends on more than the visible information. These two authors express the importance of using sound in the right way, which may be the result of fantastic sound design or a representa-

1 He explains how music can have various functions within audiovisual media, and in this case applied to video games, which he classifies into narrative functions, functions related to action, functions related to time and functions related to space.

2 A term used by the Finnish architect Pallasmaa (2005) to refer to the way in which in the West has separated vision from sensory experience and embodied knowledge. Consequently, in ocularcentrism, sight is considered the fundamental element to reach "the truth" and "reality" and is therefore given more importance that the other senses (Cortés, 2016).

tion of an existing soundscape[3]. In this way, we can see how certain sound patterns and universalisms are codified so that the player's listening experience complements their visual experience. We can say that the previously encoded information that comes to us through auditory channels must line up with the visual spectrum in order to offer the player an appropriate setting. Jiménez and Rodríguez say the following about how sound and image can jointly create an environment:

> Sound becomes a key substrate for the formal achievement of the medium. Since communication is established through the various visual and sound resources acting mainly in an integrated way, stimulating multisensory perception and constant dialogue between the individual and the operating system, or between individuals through technological means, in this case digital[4] (2015, p. 532).

When discussing what we mean by coding methods and sound universalisms in soundscapes, it should be noted that these concepts stem from considering the proper construction of a sensory environment. A point to bear in mind is that these sound constructions are within a symbolic sphere, so they are not limited to representing real acoustic sources and may use references from other media (television, cinema or animation) to create a sense of harmony between the sound discourse and what the player is seeing.
This transmedial influence is found in games such as *Cuphead* (MDHR, 2017)[5]. The sound design is influenced by 1950s animation and uses sound particles of that era for actions such as jumps, blows or footsteps. The aesthetics in the sound editing likewise resonate with our cultural ideas about "old music" consistent with a faint white noise or equalization that enhances the high-pitched mids, or audiovisual techniques such as *mickeymousing*[6]. In this regard, O'Keeffe adds:

> With what definition of reality are we comparing this soundscape of virtual worlds and how real do we want our virtual environments to be? Most of the environments we experience within games are spaces that we may never actually experience. Our experience of certain soundscapes can be understood in relation to other media representations: television, Internet and cinema. The soundscape of the digital game then becomes a construction of definitions rather than a simulated reality (2011, p. 56).

Even in cases where the objective is to evoke a historical reality, as in some episodes of *As-*

3 Maldonado, F. & Roquer, J. (2019, feb 14) *Paisajes Sonoros Históricos: Análisis del entorno sonoro y modelo para su representación audible* [Comunication] Congreso MUCA. VI Congreso de Música y Cultura Audiovisual, Murcia, Spain.

4 All translations are the author's own.

5 With sound from Sweet Justice Sound.

6 *Mickeymousing* is the use of music in relation to the moving image. It occurs when the music is synchronized with the beat, reinforcing the action onscreen.

sassin's Creed (Ubisoft Montreal, 2007)[7] or *Kingdom Come: Deliverance* (Warhorse Studios, 2018)[8], we find that the sound design "is more based on the interests of the game and what the designer wants to use, often based on what they hope the player wants to hear, than on historical recreation" (Jiménez and Rodríguez, 2015, p. 533).

The theories of anthropologists Domínguez (2007) and Llorca (2014), which not only define a sound territory as a sensory environment but also as a key element in forming the cultural identity of a population, suggest that this type of work — video games — may appeal to the collective memory of a place/time more than to explicit knowledge of the cultural practices they are trying to represent. Similarly, Guirao (2017) investigates the development of the sound setting in the game *World of Warcraft* (Blizzard Entertainment, 2004)[9]. His study examines how technological processes can construct cultural realities from existing identities in video games. Although Guirao's work mostly refers to the music-cultural aspect, simply playing the game reveals how the soundscape fits this process and helps shape the cultural representations of the different races – the soundscapes of a night elf and an orc village, or the footsteps of a tauren and a gnome being totally different. This helps the player to assume that what they are hearing is credible and thus, as previously stated, the soundscape contributes to shaping the narrative.

To conclude, it is necessary to consider the morphology of the soundscape. Identifying which elements are part of it should result in more accurate representations since the sound sources will be more appropriately projected and distributed, and, in turn, gain greater acceptance by the player. Several models classify sounds into various categories. Here we will include one proposed in previous works (Maldonado, 2018) which orders sound sources into "ensemble sources" (which could be considered sources of background sound) and "idiosyncratic sources" (also called "sound marks"): those that have an acoustic or social relevance that allows them greater prominence in the acoustic space. These two elements are subject to the acoustic characteristics granted by the ASP (Acoustic Space Profile), which directly affects how sound sources are heard – for example, with more or less reverberation or with an equalization that simulates the interior of a room. With this information, sound designers can create constructs consistent with the visuals. Kutay (2006) in fact describes how "sonic sludge"[10]can be prevented. He says it is important for the sound designer to prioritize sounds, describing which are most important at certain times. In doing this, the designer has to create sounds that fit with all the others that may occur at the same time (Huiberts,

7 The first game was released in 2007, with several episodes set in various historical eras. The sound was directed by Aldo Sampaio.

8 With sound by Vojta Nedved.

9 For this game, the production company worked with various sound designers, such as Tracy W. Bush and Russell Brower.

10 Kutay uses the term "sonic sludge" to refer to an accumulation of layers of sounds that also acquire an exaggerated presence, thus causing an unintelligible signal that can be considered noise. This concept has similarities to what Schafer calls a low-fi soundscape (1977).

2010). Jørgensen (2008) also argues that symbolic sounds are key components in player versus player games. It is therefore imperative that the sound design addresses this need and that these acoustic priorities are previously established.

Reflections on sound reception

Information from both visuals and sound, transmitted sensorially through the video game, greatly influences the player by capturing their attention to complete an action or engage in the story. There is also a fundamental difference between the degree of attention required when playing a video game and when watching a film at the cinema. In this sense, Pine and Gilmore (1999) make a clear distinction between the two environments, stating that absorption occurs when someone enjoys an experience that engages their attention, while immersion takes place when a person "physically or virtually enters" said experience. With these definitions, we can draw the conclusion that immersion – a state that occurs in video games – is achieved by the user's interaction with the main actions and also with the virtual environment in which the action takes place. As we have seen, sound elements are key to achieving this state, thanks to concepts such as the added value that sound brings to the image, or Certeau's ideas that non-visual information is very important in configuring a space.

Returning to the ideas presented in the first section, there is another element that is key to achieving this state of immersion defined above: the intention to listen. To capture the player's attention, the idiosyncratic sound marks that provide specific information to the player are just as important as those that contextualize the video game environment. In fact, Van Leeuwen defines immersion in relation to sound design as something that occurs when sound is perceived to come from all directions (cited by Huiberts, 2010). There is therefore a dual dimension to how the player experiences the soundscape of a video game, one aspect of which results directly from interaction with the environment and the other from the intention of listening without having to interact with it: a concept similar to Schafer's active listening (1977) but in a virtual environment. This second dimension is experienced in games such as *The Witcher 3* (CD Project RED, 2015) and *Doom Eternal* (Id Software, 2020) in which players can make use of their "intention to listen" to the soundscape and even distinguish elements from it without taking any action. To recap, a player can feel immersed in the sonic sensory experience of a video game when they have the ability to perform actions (to interact) and also, although not necessarily, when they are able to passively listen to the environment (intention to listen).

Immersion is a concept also addressed by Taylor, who says there are two types: the diegetic, caused by the act of playing; and the intradiegetic, which is the immersion "in the virtual space created of the game situated both through the perspective of a character and an embodied point of view" (2002, pp. 8-12). Here we observe a system of immersion by degrees (comparable to a process), in which the author says it is necessary to be diegetically immersed before moving to the intradiegetic phase, since the latter is a deeper state.

Ermi and Mäyrä (2005) contribute to the discussion on immersion and categorize it into three sections: sensory immersion (created by graphics and audio), immersion based on challenges, in other words, on overcoming actions or challenges within the game; and imaginative immersion, which arises when the player empathizes with their character or with the story. Of these three elements, two are created by the player and, although the sound contributes to them (for example, in the sound particles that can be heard when killing an enemy), we are going to focus on so-called sensory immersion, since it specifically affects the morphology of the acoustic space of the game.

This acoustic space, from the player's point of view, can be analysed using the IEZA model, which organizes the sound of the game using a graph with two axes, resulting in four parts: Zone and Effect (diegetic sounds); and Affect and Interface (extradiegetic sounds). Since the intention of this article is to study soundscape, only sounds integrated within the diegetic space will be taken into account. Nevertheless it is important to add that these diegetic sounds can be onscreen (visible) or offscreen (only in the audio). Zuniño would say that "diegetic sounds are from the simulated world; noises of screams, footsteps, gunshots and explosions in a war game, and extradiegetic sounds are those outside the world and far from an apparent reality" (collected by Jimenez, 2015, p. 540).

The first quadrant, Zone, corresponds to what game designers often refer to as ambient or background sound. "This is used to provide a background to the game, giving information about the environment" (Huiberts, 2010, p. 26). Ensemble sounds are therefore commonly subject to the characteristics granted by the ASP (which can include spatial positioning with the option of panning[11] if technology allows). As for interactivity within Zone, we can say that this does not occur. For example, in *Another World* (Delphine Software, 1991)[12], the environment is audible but there is no way of interacting with it. This section (Zone) has been gradually added throughout the history of video games as technology has progressed and is therefore much more present in modern day productions. When Zone sounds are present in a video game, whether with a realistic or fantasy theme, they are advocating a sensory experience that resembles the real world and so we can say this is "realistic immersion". In contrast, in the absence of a sound background, the aim is "symbolic immersion" since the objective is to enhance interactive actions rather than emulate a sensory experience.

The second quadrant, Effect, refers to sound sources that are present within the reality of the video game and that are produced by the player's activity. Sounds made by the avatar and its interactions are common examples of this domain in current games. Sounds may include footsteps, breathing, dialogue, the sounds of weapons such as guns and swords – including from other players in the network – sounds of colliding vehicles or objects. In addition, in games such as *The Witcher 3*, mentioned previously, the player can interact with

11 A feature added with the SNES in 1991 allowing the use of ambient acoustics to be implemented in games such as Zelda III.

12 With sound by Tommy Tallarico.

almost the entire environment and cause new sound particles to be created. This is because the sounds that belong to this quadrant are often designed to react to the player. This denotes a "degree of interaction" defined by the aesthetics of the game or by the technology (ranging from being able to interact with the character's actions to free interaction of the environment). Finally, it should be said that the sound sources present in Effect can be both ensemble and idiosyncratic sources indistinctly. An example of this occurs in *The Witcher* when animal sounds are heard in the forest. When using the *sorcerer's senses*[13], however, the sounds of animals that may be potentially dangerous (bears, wolves or others) are enhanced, thus changing from a background sound to one that gives the player information – a change from ensemble to idiosyncratic sources.

The following diagram provides a compendium of the given concepts by way of conclusion:

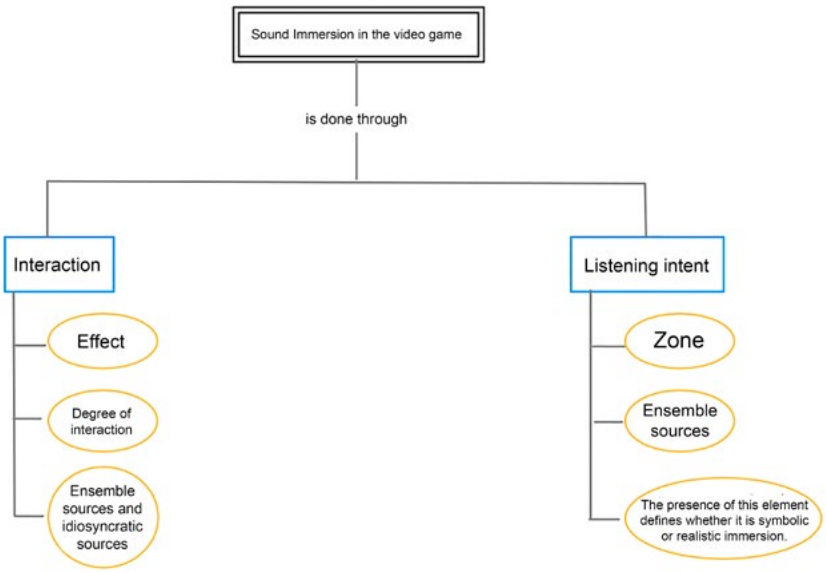

Figure 1: Sound immersion in video games

Analytical model: the ring system

The following section explains the system of analysis carried out in this research taking into account the previous concepts. This system aims to provide a clear representation of the parts that make up the soundscape of each video game in order to reflect on how the player is immersed in it.

This model is based on a central circle (nucleus) that gains additional rings as the characteristics of a game's soundscape are discovered. There are three main reasons for using this type of representation. In the first place, a visually clear system will allow acoustic characteristics (which may or may not be present in a video game) to accumulate around a shared

13 Mechanics that enhance the character's senses so they can pick up clues, become aware of danger or hear warnings.

element, in this case the nucleus, which represents the interaction of the avatar or character. This facility of the ring system enables a better analysis of the soundscape morphology. The second reason is that the type of representation must be able to compare more than one element. In this model, the circle is divided among the different video games to be compared, with their corresponding rings clearly showing the differences in the number of characteristics. Lastly, this type of representation is easily accessible compared to some complex sound literacy systems, which are often based on the tradition of Western musical writing or musicograms and which are skewed to a specifically musical profile.
The rings represent the concepts developed in the previous sections and follow a specific order explained below:

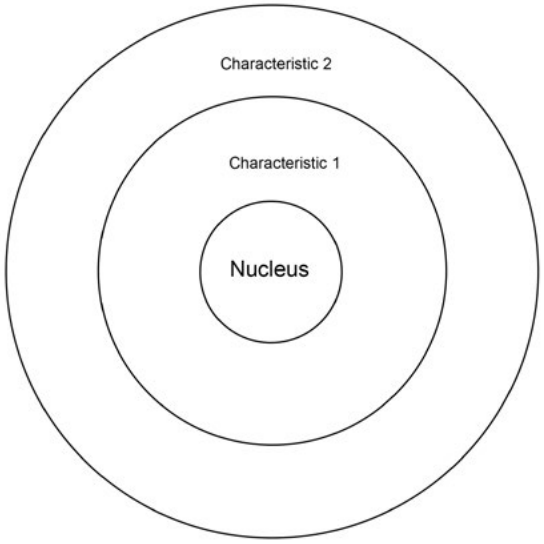

Figure 2: Example of the ring system

The central circle contains the characteristic shared by all video games: *interaction based on the character's actions*. The next ring, labelled "Characteristic 1" in the example, relates to the "intention to listen", and "Characteristic 2" to "free interaction with the environment". These rings in the example will be followed by one representing "spatial positioning" and, finally, "sound particles from other players" connected in a network.
These concepts have been chosen since, as observed in the theoretical framework and in Figure 1, they typify the most representative properties of a soundscape when considering the immersion of the player. They therefore bring together elements of Zone and Effect, or theory about the amount of acoustic information the player will receive.
The way to obtain the sound information corresponding to each category is by experimenting when playing. Therefore, the validity of the system is linked to how the player receives it and its significance. In this way, for the shared characteristic of "interaction based on the character's actions", acts with the avatar are limited to those that make a sound; for

"intention to listen" the player has to leave the avatar inactive and listen to the environment; for "free interaction with the environment" the player must experience as much interactive sound as possible, and the avatar must therefore perform different types of actions with elements of their surroundings (such as shooting walls, hitting elements, injuring an animal, etc.); in "spatial positioning" – best captured with the use of headphones – the player must notice the use of panning in order to locate the events of the video game; and finally, "sound particles from other players" is intended for cooperative or competitive video games which have more than one participant. In this case the activity – and the sound signals – of each player can be perceived by their opponents or allies. Next, we will look at the graphical comparison of several video games for further discussion.

Technological evolution

The example below represents the following games: on the left *The Witcher 3* and on the right *Donkey Kong* (Nintendo, 1984) in its version for Apple II. At a glance we can see there are a large number of sound elements present in the game on the left. This representation shows that a player can hear the sounds produced by the sorcerer, interacting with total freedom, or remain inactive and listen to the environment. In addition, having a sound system that allows the player to identify where the sound source is located will provide a sensory sound experience that closely resembles the experience in real life. This is quite different to the representation of *Donkey Kong*, in which the only sound particles are those generated by the player (in this case footsteps and jumps).

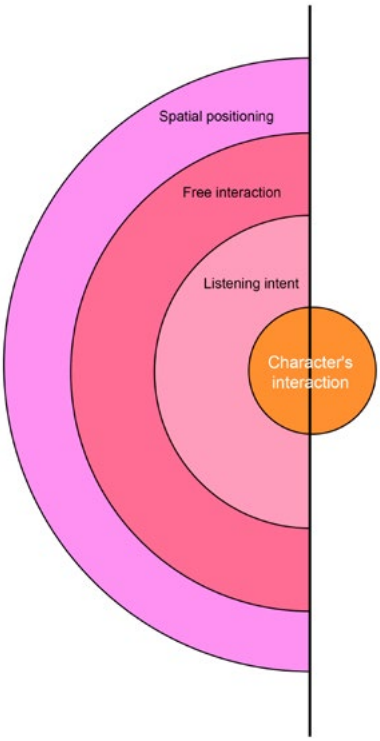

Figure 3: Example 1

Despite the significant difference in sound elements in this example, the concepts above prevent us from talking about "better" or "worse" immersion. Instead, in *The Witcher* the immersion would be defined as realistic and in *Donkey Kong* as symbolic. This argument is justified by observing the morphology of the soundscapes and by understanding that the purpose of the symbolic immersion is to enhance the sensation of "playing" by using sound particles (such as the sound when completing a level) to position the player as the saviour of the character's girlfriend. Thus, we observe that symbolic immersion shifts between two of the categories established by Ermi and Mäyrä: sensory immersion and immersion based on challenges, which arises through overcoming actions or challenges within the game. Although these elements are present in current games, they are used in a noticeably more differentiated and aesthetically integrated way.

These differences allow us to speak of a technological evolution, since previous resources available to develop video games were much more primitive and the sound was limited by two factors. The first of these was the capacity of the devices themselves, which were unable to accommodate large amounts of material and so the sound was limited to elements necessary for the setting. Secondly, earlier sound compression technology prevented the use of realistic sounds, so instead of recording audio, the first sounds were created by reproducing square waves – popularly known as beeps – that came from the internal speaker, later followed by the use of specific sound cards (Vaqué, 2011, p. 25).

Aesthetic decisions

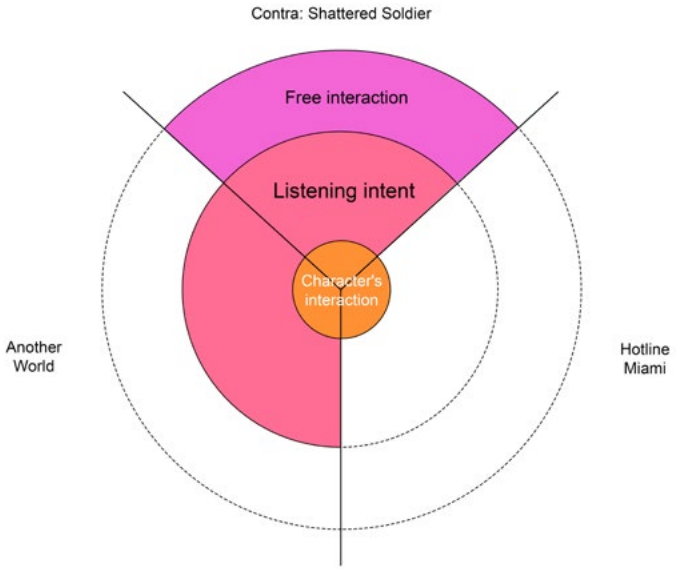

Figure 4: Example 2

This section uses the examples of *Another World* (Delphine Software, 1991), *Contra: Shat-*

tered Soldier (Konami, 2002) and *Hotline Miami* (Dennaton Games, 2013)[14]. This case serves to illustrate how aesthetic decisions also influence the composition of the soundscape. First of all, the background sound of *Another World* changes depending on the various locations and the sounds produced by the character's interaction. However, the degree of such interaction is limited to the narrative of the game. This contrasts with *Contra: Shattered Soldier*, in which the interaction is freer and allows actions to be performed with the environment. This game also has ambient sound (although it is true that the level of the music relegates it to small, almost inaudible sound samples). It should be added that the aesthetics of this game, in which the action takes place horizontally and from a third-person point of view, do not account for any spatial notion of audio. This perspective – which is similar to a platform game and was justified at the time by technological limitations – is a hallmark of the *Contra saga*. Even once the technology was available, it did not become a first-person system and develop an environment with a spatial dimension until 2018. The third element included in the graphic is *Hotel Miami*, played from an aerial third-person point of view and with a retro aesthetic that simulates video games from the mid-eighties in terms of both visuals and sound. Thus, despite the availability of the technology required to produce more realistic sounds, we find that 8-bit sounds were adopted in pursuit of an aesthetic coherence that simulates a technological limitation.

This example shows that the number of rings does not have to mean more technology, but that aesthetic decisions modify and define the path that the sound designer chooses when constructing the soundscape.

Electronic sports and sound information

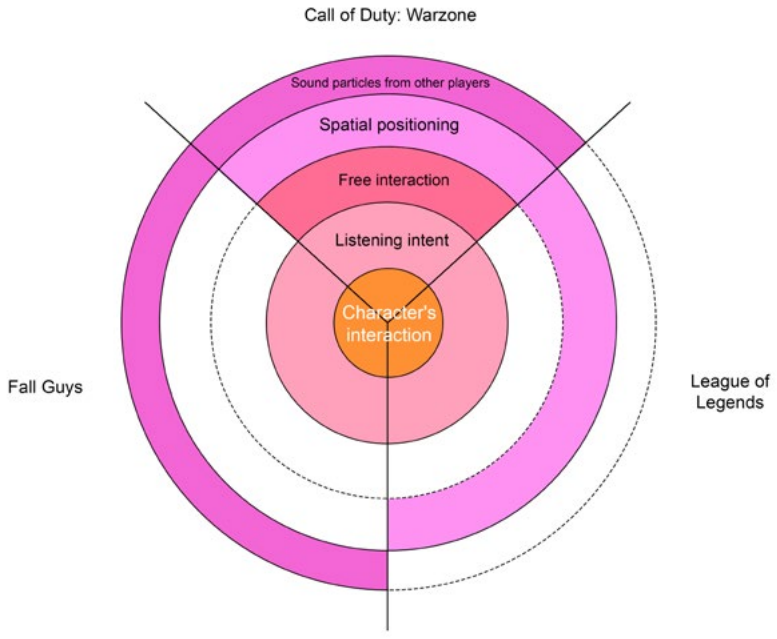

Figure 5: Example 3

14 With sound by Jordan Fehr.

As a final example, we should mention games which involve confrontations between real players. The games used to illustrate this are *Call of Duty Warzone* (Infinity Ward, 2020), F*all Guys* (Mediatonic, 2020)[15] and *League of Legends* (Riot Games, 2009). Here we can see two sound elements present in all cases: those arising from the avatar's interaction and those from the other players (in the graphic with the same colour). This is explained by authors such as Grimshaw and Schott (2007), who indicate that this type of information is the most important to ensure competition and correct gameplay, and that it is essential to obtain data from teammates and enemies in order to develop a game strategy.

In this way, the sound morphology of *Call of Duty*, in which the shooter theme makes it easy to adopt a realistic aesthetic, takes us into a fairly complete sensory experience where, in addition to the presence of the key sound information necessary to win a game, players can explore the environment freely. *League of Legends* has a fantasy setting similar to role-playing games and is a team video game that consists of achieving objectives (such as killing opponents or knocking down towers) to obtain coins which players can use to buy equipment for their characters and facilitate the final task of destroying the rival base. These characteristics of the game mode mean that the environment is not wholly interactive and depends on whether the action is used to gain a benefit[16]. The similarity with shooter games is the importance of the spatial location information for the team and this is reflected in the graphic. In contrast, the last video game in the analysis, *Fall Guys*, does not require the source of the sound to be identified since the objective is to overcome a series of obstacles to reach a goal. Therefore, the rivalry consists in trying to get there first rather than fighting an opponent. Here, the avatars' voices stand out when performing actions such as jumping or crashing, in line with the cutesy aesthetics of both the visuals and sound.

Conclusions

The primary intention of this work was to be able to analyse the morphology of the sound space in a specific way in order to understand how sound can be organized so that the user has the desired experience. The ability to transfer theories from sonology, musicology and anthropology in order to correctly define the object of study shows the transdisciplinary nature of sound studies.

The path this article has taken shows that the soundscape of a video game first requires a sound design influenced by real life and audiovisual environments or the audio creations of sound technicians. Second, these sounds go through a classification system which defines the relevance of each sound, thus establishing a hierarchy that helps the player understand the information the environment can provide.

These processes, which are in the more technical section, fulfil their function when the

15 With sound by Enrique Alcor Martín.

16 This video game has a multitude of playable characters each with various abilities, so while the environment is not interactive in general, there may be a specific ability that produces a sound particle when interacting with a particular element of the map.

player enters a state of immersion. As explained, this immersion is not strictly linked to technological advances or to the aesthetics of the game, thus establishing two categories – realistic and symbolic – which both aim to capture the player's attention but have different means of doing so.

Finally, the soundscape is one of the hallmarks of a video game and a key element in its configuration, an issue we have seen in the examples in the last section. The configuration of the sound design creates aesthetics that are later replicated and even taken to other formats (for example, the cinematics and film based on the *World of Warcraft* universe). It is therefore imperative to begin to acknowledge the importance of the sounds that occur in games, to activate our "sorcerer's sense of hearing" in order to recognize the role of the sound design within the sound universes we enter into.

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