CONCEPTS REGARDING SOUND IMMERSION AND INTERACTIVITY IN FPS GAME AUDIO TECHNOLOGY

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by

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LIST OF ABBREVIATIONS

AI	Artificial intelligence
CoD: WaW	Call of Duty: World at War
FPS	First person shooter
HUD	Heads up display
IEZA	Interface, Effect, Zone, Affect
NPC	Non playable character
PC	Personal computer
RTS	Real time strategy
SCI	Sensory, Challenge-based, Imaginative
WWII	World War II

KONSEP MENGENAI RENDAMAN DAN INTERAKTIVITI BUNYI DALAM AUDIO PERMAINAN TEKNOLOGI

ABSTRAK

Penyelidikan ini akan meneroka darjah bunyi dan muzik yang akan meningkatkan immersi pemain dan interaktiviti pemain dalam pengalaman permainan. Dengan kata lain, ia ialah satu kajian immersi dan interaktiviti dalam permainan-permainan digital terpilih di konteks audio. Immersi dianggap sebagai salah satu faktor utama yang membuat permainan layak dimain. Untuk mereka s*oundscape* permainan komputer yang membolehkan seseorang pemain berasa immersi dalam dunia maya mereka, kami mesti memahami cara kami mengemudikan dan faham *soundscape* dunia sebenar. Kajian ini juga menjelajahi hubungan antara audio permainan dan immersi permainan video. Tanggapan dan imaginasi di media interaktif, dan cara mereka dicipta oleh bunyi, imej, dan tindakan juga akan disiasat. Satu lagi tujuan adalah untuk mengkaji peranan reka bentuk bunyi yang berperanan dalam pembinaan permainan interaktif immersive. Kertas ini menggunakan kesusasteraan yang wujud untuk mengesani cara bunyi menyumbangkan kepada immersi dan seterusnya membincangkan cara reka bentuk yang baik untuk mewujudkan immersi yang tanpa peruraian. Dengan kata lain, ia adalah untuk menentukan cara immersi ditakrifkan dalam soal menyerap seorang pemain ke dalam dunia permainan ketika merenggangkan pemain dari dunia sebenar; satu kesan yang diistilahkan pereraian. Pendekatan analitikal saya akan berdasarkan IEZA model dan SCI model supaya menentukan kepentingan audio berkaitan dengan idea immersi dan interaktiviti di permainan-permainan digital. Didapati bahawa kekurangan penulisan mengenai bunyi permainan digital dan fakta kajian permainan merupakan usaha baru-baru

ini – beretinya kebanyakan bukti empiris yang diperlukan masih belum dikumpul atau dikaji, dan kajian yang dikumpul tidak dapat membuktikan sepenuhnya. Untuk memahami faktor yang menjurus kejayaan satu permainan interaktif, satu kajian yang mendalam mesti dikendalikan dalam faktor immersive (yang dipertingkatkan oleh muzik dan bunyi) dan komponen-komponen konsituennya. Lagipun, faktor immersive satu permainan selalunya memberi manfaat besar dalam industri yang syarikat-syarikat mengupah berbilion dolar untuk mempertikaikan siapa yang akan dapat memasarkan system keajaiban teknologi besar berikutnya, menggantikan pertikaian dengan menarik perhatian berjuta-juta orang pemain permainan interaktif untuk melabur dengan perjanjian satu konsol permainan interaktif baru yang menyediakan cerita-cerita immersive, watak, bunyi, dan wawasan yang lebih baik. Pada dasarnya, kajian ini berusaha untuk melanjutkan penyelidikan dalam immersi bunyi dalam permainan-permainan digital.

CONCEPTS REGARDING SOUND IMMERSION AND INTERACTIVITY IN FPS GAME AUDIO TECHNOLOGY

ABSTRACT

This research will explore the degree of sound and music affect and enhance the immersion and interactivity of an FPS game player in selected digital games. In other words, this is a study of immersion and interactivity of selected digital games in the context of game audio. Immersion is considered to be one of the key factors segregating games that are worthy to play. In order to design a computer game soundscape that allows a game player to feel immersed in the virtual world, we must understand how we navigate and perceive the real world soundscape. This study also explores the relationship between game audio and video game immersion such as the perception and imagination in interactive media and how they are created by sound, image, and action will also be investigated. Another purpose is to examine the role of sound design plays in the construction of an immersive interactive game experience. This thesis draws on existing literature to trace exactly how sound contributes to immersion and consequently discusses how sound design can create immersion without disassociation. In other words, to determine how immersion can draw a player into the game world while distancing the player from the real world, an effect termed as “disassociation”. My analytical approaches will be based on the IEZA model and SCI model in order to determine the significance of audio in relation to the idea of immersion and interactivity in digital games. To date, there has been very little written on digital game sound and the fact that game studies is such a recent endeavor implies that much of the needed empirical evidence has not yet been

substantially gathered or researched. In this regard, a thorough study must be conducted on the audio as an immersive factor, and its constituent components in order to better understand the factors that lead to the success of an interactive game. After all, the immersive factor of a game is often its greatest advantage in an industry where companies wage billions of dollars in a contest to see who can create the next best technological wonder-system, supplanting the competition by luring millions of interactive game players to invest with the promises of a new, better quality interactive gaming console providing ever more immersive stories, characters, sounds, and visions. Essentially, this study sought to extend the research on sound immersion on digital games.

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The growing popularity of digital games has significantly improved the quality of gaming forty years since its existence. Not only have the gaming graphics progressed greatly, but game audio has also evolved rapidly in the past decade; from the simple bleeps and beeps to complex orchestrated dynamic soundtracks with context supporting sound effects. An important factor that contributes to the success of a digital game is the idea of immersion, which refers to an experience of being drawn into the virtual world of the game. This is a process that is centrally dependent on the player's detachment from everyday which is referred to as disassociation (Ekman 1). Since immersion is an important element that all digital games have in common, game developers strive to achieve the same goal (Varney). However, the notion of a player's immersion and the audio's role in this process are not thoroughly understood.

This research aims to study the concept of immersion in digital games. The study will focus on the relationship between game audio and the player's gaming experience; known as interactivity in game immersion. The main focus of this study is audio as this will lead to a better understanding of a player's immersion experience in gaming.

The primary purpose of this research is to expand and provide updates to the existing ideas on the topic, as well as delving into prior works regarding the concept of immersion in relation to audio and digital games. The study will involve the application of two theories as both analytical and interpretation tools: Ermi and Mäyrä's three-dimensional SCI-model (2005) as representation of the multi-dimensional character of

immersion and IEZA model by Huiberts (2010) pertaining to audio in relation to immersion that deals with audio.

1.2 BACKGROUND OF STUDY

1.2.1 COMPUTER AND VIDEO GAME CONSOLES

Computer and video games have been around since before the start of the digital age. The digital age, also called the information age, is defined as the period which begins in the 1970s with the introduction of the personal computer equipped with technology to transfer information speedily, along with video game consoles in the 1980s.The difference between the two is that computer games are games played on Personal Computers (PCs), either laptops or home computers, while video games consoles require special to connect to the television and game controller before a player is able to play the game. Despite the, both of these games provide interaction, which require the player to interact using certain actions on the screen through some input device; for example computer games uses a mouse and keyboard, while video games use joysticks or joypads/gamepads or other controllers.

1.2.2 DIFFERENT GENRES OF DIGITAL GAMES

Other genres of games besides the 'First Person Shooters' (FPSs) genre are discussed in this section in order to explain how they are different from FPS, and understanding the context of FPS in relation to other games. In digital games, the principal element that is used to establish genre is its interactive content (also known as "gameplay"). This method of dividing games into different genres makes the most sense commercially, as it would allow a potential buyer to determine the type of gameplay without having prior knowledge

of the game. Below are the certain genres which are recognisable to most players of digital games.

1.2.2.(a) THE FIRST PERSON SHOOTERS

A First Person Shooter, as the name suggests, is a genre played from the first person perspective, and involves the use of some form of weapon such as a gun which can be realistic. It is frequently abbreviated as "FPS". Due to its three-dimensional nature, FPS is usually preferred to be played with a mouse and a keyboard, as this facilitates controlling the avatar in the game; the keyboard controls the placing of the avatar within the gaming universe, where the mouse controls the direction the avatar faces.

1.2.2.(b) OTHER GENRES

1.2.2.(b)(i) THE ROLE PLAYING GAMES

Role Playing game (RPG) is a genre in which players take specific roles of a character(s) in a specific gaming environment, such as a fictional setting to engage the players in certain adventures. Example of such games are the *Final Fantasy* series, etc. As the name implies, FPS is a game which requires shooting in which the player assumes the first person role, and it involves shooting enemies within sight, while RPG is a role playing game which is heavy on story, which usually revolves around swords and magic in the third person perspective. In short, FPSs are usually about the experience of moving around and shooting at people, while RPGs are more static and focus more on storyline or dialogue.

1.2.2.(b)(ii) THE SURVIVAL HORROR GAMES

Survival Horror game is a genre similar to FPS but focuses on survival of the character while trying to scare the player(s) with gory and horrific scenes. The player is made to feel less powerful with the limitation of ammunition, health recovery, speed and other limitations. Example of such games are *Amnesia*, *Silent Hill*, and etc.

1.2.2.(b)(iii) THE REAL TIME STRATEGY (RTS)

Real Time Strategy games are games that put the player in the third-person role, usually as a commander of some military force with the purpose to secure areas of the map, and/or destroy their opponents' assets by giving out commands to attack, build or move. Example of such games are *World of Warcraft*, *Red Alert,* etc. This genre differs from the previous ones mentioned as it provides a third-person perspective in a combat game which provides the players with an eagle-eye view of the battlefield, and allows a player to control units of an army, resources, and NPCs (non-player characters) to fight other players, or NPCs for victory where the player does not play as any single character like the FPS. The real-time aspect -is due to the fact that players in the game of this genre do not have to wait for their individual turns, but are in constant motion.

1.2.2.(b)(iv) THE FIGHTING/DRIVING GAMES

Fighting games are games in which short bouts of one-on-one fighting ensue, until either player or computer-controlled character losses all of his hit points (HP), or the timer runs out. Driving games are games that are played on one race course at a time, though the amount of laps might vary from one level to the next. Unlike the FPS genre, in fighting games the player typically fights other players or the computer in some form of one-on-

one combat while racing games typically place the player behind the wheel, and involve competing in a race against other drivers and/or time. These games only require the player to fight or drive and does not require the player to perform more than one task simultaneously like the FPS, which requires the players to navigate the environment and search for hostages or material, while simultaneously looking out for threats that will suddenly appear on the periphery.

1.2.2.(b)(v) THE PUZZLE GAMES

Puzzle Games are games that emphasise puzzle-solving, and focus primarily on the players' ability to figure out or memorise patterns in order to solve various forms of puzzles, where short levels are played one at a time. Example of such games are *Solitaire*, *Minesweeper* etc. Puzzle games are not focused on any characters or weapons like FPS, rather they are focused on a player's ability to solve puzzles or problems and involve the exercise of logic, memory, pattern matching, reaction time, etc.

1.2.3 AUDIO IN DIGITAL GAME TECHNOLOGY

Audio is an important component of immersion and to this end, game audio has become the focus of academic studies which encompasses multi-disciplinary perspectives on the players as well as the significance of audio on game-play experience (Collins, "Playing with Sound"). Generally, game audio refers to the music, sound effects, and voiceovers in digital games. Audio plays a huge part in the story telling and it also contributes the fun factor for games. It has always been an important, interactive element in game-play from the start. At first, it only gives the player the notion of success or loss, and enhances overall feedback. Computer graphics and audio have developed concurrently with the evolution

of multimedia computers. A corollary of this evolution, is the development of games which have become more sophisticated; next-generation audio is necessary to strengthen the immersive element of the overall gaming experience.

The player(s), make use of or highly dependent audio to navigate through the game environment, to interpret information and events as they occur in the game. More importantly, audio affects the game-play experience. Categorisation of audio in digital games will be following the film sound theory which states the following: diegetic[1] and non-diegetic sounds, which diegetic being the sound or narrative that includes all the parts of the story, where source is visible on screen or whose source is implied to be present by the action of the screen while non-diegetic vice versa (Curtiss; Chion for example). This notion of diegetic and non-diegetic sound had been imported to game sound theory by a number of authors (such as Grimshaw; Jørgensen).

1.2.4 IMMERSION AND INTERACTIVITY

The term "immersion" is a frequently encountered or debated subject that is used in discussing digital games and game-play experiences. There is a highly diverse understanding of the meaning of the term, some say it is a myth; some say it is what is in your head; while some say it is what you experience; but most gamers say, nonetheless, it is what really matters in video games.

A player's immersion is the holy grail of game design (Rollings & Adams). The sense of the player having the experience of being absorbed in or 'becoming' the game

[1] The term *diegetic* derives from the Greek word for narrative.

character in the game or acting 'within' the game world is most commonly known as 'immersion'.[2] Immersion is a powerful experience of gaming, it is of importance for gamers, designers, and game researchers (Garneau).

Apart from immersion, to understand the players' interactivity with digital games, the best way is to start with a general definition of what constitutes interactivity before applying it to video games. In general, to interact means to "act one upon another"[3]; to engage with another person or object. Similar to the human interactivity, the basis for any community or society in general, the interaction between the player and the game environment requires the player to react and make choices, and that interaction with virtual characters in a virtual space therefore encourages the player to actively participate within the game world (Hershman). It can be described as "the ability of the user to interact with a computer which can be used to control the flow, pace, and content of a program."[4]

On the whole, to assist in the possible improvement of audio design in digital game industry, it is therefore important to understand the structure of the digital games platform itself, game audio and the notion of immersion and interactivity first.

1.3 STATEMENT OF PROBLEM

Although there are many research on gaming, the little recognition of game research is extremely disappointing for an industry that is worth $30 billion. In recent years, the number of computer users has increased significantly; especially amongst teenagers where

[2] Other terms are, for instance, flow (Csikszentmihalyi, 1997), incorporation (Calleja, 2007a).
[3] Webster. Webster's Encyclopedic Unabridged Dictionary of the English Language. Dilithium Press, Portland House, NY: 1989. <Interact> p. 739.
[4] Summers, Jodi. *Interactive Music Handbook: The Definitive Guide to Internet Music Strategies, Enhanced CD Production, and Business Development.* New York: Allworth Press, c1998. P.247

games are just as important as movies, television, and books (Peerdeman). Past studies lack input on the method of audio creation and production despite its importance in the design stage, most past studies are lacking. This method will shed some light on the level of interaction made possible in digital game which directly relates to the player's immersion and participation in a game-related acoustic ecology.

The concept of immersion is often explored, however it does not have a stringent, or consistent definition, and is often confused or compared with various other concepts such as presence or absorption (Calleja). Lack of insight into the role of game audio coupled with little research conducted in the area of interactivity, in particular the relationship between the player's- game-play experience and how audio contributes towards immersion in digital games. It also does not help that these studies are not up-to-date.

1.4 RESEARCH OBJECTIVES

This study is to fill the gap in the literatures on audio as being a component of immersion and provide up-to-date research on this topic . As such, this research proposes to explore and measure a player's immersion in digital game and a discussion on audio as the main component that influences a player's immersion in game will be provided based on the following objectives:.

1. To analyse the role of game audio in enabling an immersive experience to the player.
2. To examine the relationship between the player and game audio in an immersive digital game environment.

3. To determine the potential and limitations of audio interactivity within the FPS game.

1.5 RESEARCH QUESTIONS

1. What is the role of game audio, and how does it enable an immersive experience to the player?
2. What is the relationship between the player and game audio in terms of immersive digital game environment?
3. What are the limitations and potential of audio interactivity within the FPS game?

1.6 THEORETICAL FRAMEWORK AND METHODOLOGY

Digital games are complex systems which create experiences and are rich with meaning. Therefore, semiotic methodology is useful as it provides a better understanding to the content of the narratives, the overall gaming experience, the rules of the game, and its structure. Given that immersion is often associated with the quality of design within the gaming industry, a variety of academic discussions have attempted to classify what immersion consists of and the notions behind it. To elaborate further, based on the Ermi and Mäyrä's SCI-Model, the components of the game-play experience were inspected to analyse immersion. Based on surveys carried out, immersive game experiences were divided into three dimensions which were collectively named as the SCI-model consisting of the following: ***S****ensory* (audiovisual)*,* ***C****hallenged-based* and ***I****maginative* immersion.

There are several other classifications of immersion by different authors[5], however the SCI-model is considered more suitable for describing the involvement of players with the design, because of its multidimensional model which presents a coherent classification with very little overlap. The three basic aspects of immersive game experiences explicitly show the break-up of the individual components of immersion that are easy to measure and discern.

An IEZA-model of sound event analysis was developed by Huiberts during his study on sound as an immersive design tool in the development of video games. According to Huiberts, there are two dimensions that describe the audio of a game and also four conceptual domains of communication of game audio: *Interface*, *Effect*, *Zone* and *Affect*. The first dimension distinguishes categories belonging to the game world (diegetic) and those who are not belonging to the game world (non- diegetic). The second dimension, which is the interdependence dimension, is divided into *Activity* and *Setting* of the game. As there is a general lack of functional models, the IEZA-model is made suitable and functional models for the analysis and synthesis of computer game audio.

Based on the utility of semiotics, in the SCI-Model and the IEZA-Model as discussed above, I will employ these theories and models in my analysis of the notion of audio and immersion in digital games, particularly the FPSs.

The method of analysing the design of game audio in relation to immersion in the chosen FPS games, will be utilising semiotics as analytical tools and the two models as

[5] For example, *the player involvement model* (Calleja 2011), *two types: diegetic and intra-diegetic or situated immersion* (Taylor 2002), *three types: tactical, strategic and narrative immersion* (Adams 2004b).

interpretation tools in: (1) IEZA-model by Huiberts and Van Tol to categorise sound events and to provide coherent vocabulary for the definition and typology of game audio in the digital games; (2) as for the nature of the phenomenon of game immersion, it will be studied in depth based on the theory of Ermi and Mäyrä using their SCI-model. Two titles of FPS games are selected and each game will be played or in other ways examined in detail its audio functionalities: *Bioshock,* and *Call of Duty*. These games are listed as top-rated FPS games according to Gamerankings[6].

Figure 1.1 The IEZA model for digital game audio

The quadrant labelled *Zone*, refers to noise such as wind, rain and ambient noise which represent the real world or in game environment. This is often described by audio designers as ambient or environmental sounds. *Effect***,** refers to sounds linked to diegetic parts of the game either on-screen or off-screen. An example of this could be sounds of footstep or breathing. The quadrant labelled *Interface***,** refers to non-diegetic sounds outside of the game world environment such as health level or score. *Affect* refers to

[6] A website that collects review scores from both offline and online sources to give an average rating. It indexes over 315,000 articles relating to more than 14,500 games.

sounds linked with non-diegetic parts of the environment. For example, music designed for a specific target audience such as a horror game may use a dramatic spooky score.

The structure of each game which contributes to the immersive experience will be discussed based on the SCI-model which stipulated the following: sensory immersion refers to the visual and auditory output of the game (audiovisual). The challenge-based immersion will occur when the players engage in a satisfying competitive process as a result of challenges presented by the gameplay Imaginative immersion concerns with the player's engagement with their fantasy and imaginary world as a result producing a sense of empathy.

Based on the theoretical framework discussed above, the method will in general consist of the analysis and interpretation. Essentially, the overall method is qualitative. In support of this, a qualitative analysis is done by approaching gameplay as a predominantly *configurative practice* (Vught, et al., n.p., 2012), in that we acknowledge the way gameplay requires the player to "work with the materiality of a text, that is, the need to participate in the construction of its material structure" (Klevjer, "Defense of Cutscene", 192). In other words, we understand game-play as an encounter between a player and a game system, whereby the players' experiences are achieved from automatically processing significant elements of the audio-visual feedback produced by the game, for example moving image and sound. The following are details pertaining to the method of research:

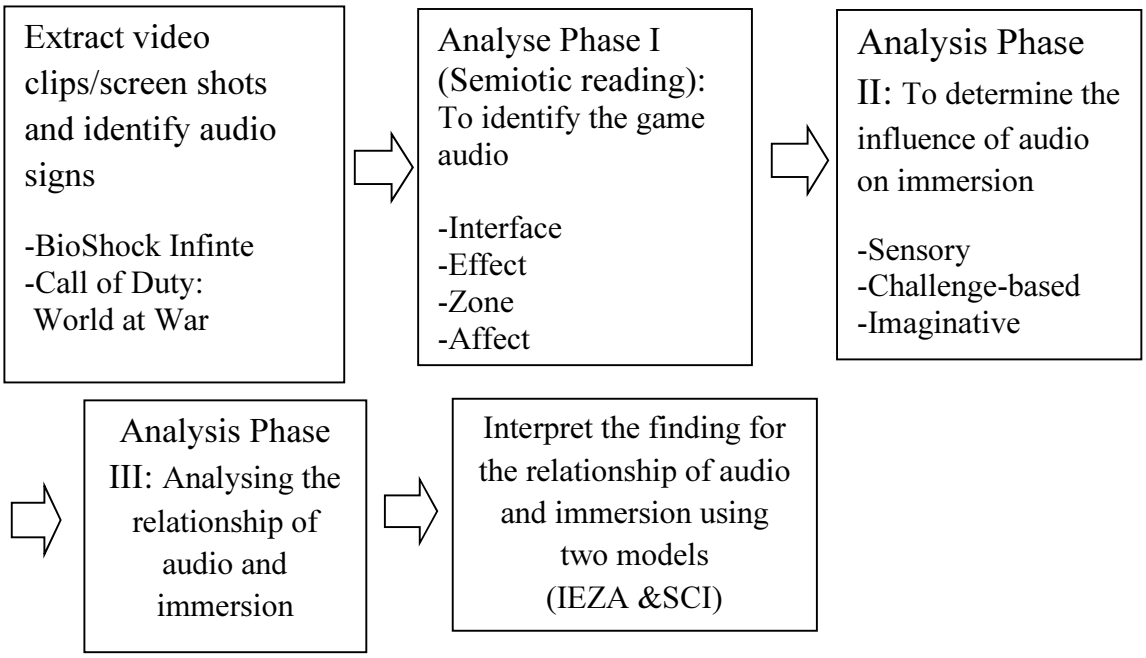

Figure 1.2 Flow chart of the method of analysis.

Screen shots of gameplay sessions (of selected games) will be provided in the analysis .This will be presented to describe the zone which represents each of the main landscape categories and a fixed sample of how the music and sound effects work in-game The story and audio of the games will be examined to capture the overall soundscape of the game (such as distinctive music, character's theme, zone music, sound effects) to explain the relationship of virtual environments. It should be noted that the analysis will be based on close reading of the gameplay experience. The analysis of audio is done using the category of *Interface*, *Effect*, *Zone* and *Affect* (IEZA).

The influence of audio on immersion will then be identified; the audio will be examined and determined as either necessary for sensory, challenge-based immersion or imaginative immersion. The purpose is to distinguish how the audio is capable of inducing this phenomenon in players of FPS and in digital games more generally. The relationship of digital game audio and immersive experiences will also be explored to determine how

the former is capable of inducing the latter, the type of specific sounds responsible for different forms of immersion, and lastly the interpretation of the findings in relation to the relationship between audio and immersion.

1.7 SCOPE OF THE STUDY

Although there is a wide range of digital games, such as arcade and mobile games, only computer and video games (home console) will be studied. This is because, according to Grimshaw (n.p.) and many other researchers, these games especially the First-Person Shooter genre are the most immersive. The reason computer and video console games were chosen for this research is because they are incomparable; secondly, there is a parallel in the level of development between the two genres; and thirdly, both involve the immersive process, but in no means is one more superior than the other

The first-person shooter (FPS) games are chosen as the best genre to facilitate immersion as compared to other genres like role-playing and survival horror due to the sound generated from first-person perspective (a 3-dimensional perspective). In this type of game, the player is positioned in an enveloping sound field as a first-person auditor, thus providing real-time interaction with the game world elements (audio-visually).

This thesis will focus on the single-player digital games only. This is because there is a fundamental difference which separates single-player and multi-player digital games which involves design, user's experience, as well as the different constituents. Multi-player game refers to a game that involves more than one person playing the game simultaneously online (either with friends or strangers on the Internet). Multi-player games allow players to interact with one another either in partnership or competition thus

providing them with the opportunity to interact, while single-player games pit the player against an AI-controlled alliance or opponents which prevents human interaction[7]. The narrative and conflict in single-player game-play is created by a computer rather than a human opponent which renders a unique gaming experience for the player by means of a more compelling story, and better immersion in the game world without the interference of other individuals. The single-player scenario provides the best example in the context of this thesis given the focus on audio and immersion process. Other components such as social interaction will not be analysed here.

The genres of the selected games will be analysed within the conceptual framework and shall include written feedback or reports from players as and when necessary.

Background study, such as author of the game will not be examined for the purpose of this thesis. However, facts pertaining to the author's background and intentions will be used as reference to justify an argument.

1.8 SIGNIFICANCE OF THE STUDY

This thesis will contribute to the field of Game Studies by presenting the significant relationship between the player and soundscape in the first-person shooter (FPS) game which influence the immersion process of the player in the gaming world. The player-soundscape relationship further leads to the creation and perception of a variety of space within the game world. Little has been written on digital game audio (much less on FPS

[7] Most prominently in the first-person shooters (FPSs), a **bot,** which is a type of weak "player" preprogrammed and controlled by a computer through Artificial Intelligence in deathmatch, team deathmatch and/or cooperative human player.

game audio); hence the research presented in this thesis will be a significant contribution to the Game Studies field. Furthermore, the points presented will provide insight into the role of sound in relation to different space in the FPS game, as well as the player's immersion in different space. , This is significant not only for Game Studies but also for other disciplines, like virtual environment design, and the study of real-world acoustic ecologies.

This thesis also attempts to further expand the knowledge regarding gaming in order to inform and help game designers in developing the audio component of game engines which can lead them to design an immersive game, which in turn will contribute to the field of game audio design

The field of audio design focuses on issues relevant to the concept of audio design, such as decision making process prior to the actual design process of the assets. These decisions are crucial for audio and game designers since their aim is to create games that will be appreciated by players. Hence, this thesis aims to guide in the development of a more intense game experience.

1.9 DEFINITION OF KEY TERMS

There are certain definitions which need to be clarified in the context of terminology in the thesis to avoid confusion and ambiguity to the readers.

1.9.1 DIGITAL GAMES

In general, the term, which is synonymous to video games, is defined as various games that can be played by using an electronic control to move points of light or graphical

symbols on the screen of a visual display unit (Collins English Dictionary – Complete & Unabridged 2012 Digital Edition).

The definition of digital games refers to the digital software that carries the programming code which allows or instructs, the computer to generate the game world, as well as the rules that govern the interaction between the player and the game world. In other words, it is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome (Salen and Zimmerman). In my case, digital games refer only to computer and video console games, excluding other games genre such as arcade games or mobile/hand-held device.

1.9.2 AUDIO

Audio in general refers to the sound, or sounds which are recorded and reproduced, and also includes voice and music (Webster's New World Telecom Dictionary). Audio can also be defined as the electronic representation of sound as analog or digital signals. Audio is basically recorded, edited, and mixed from live vocal sounds, instruments, electronic instruments such as synthesiser or computer-based generated audio (Hosken). The term *audio* in this thesis will be used in order to define sound and music in games. However, whenever a paragraph refers to music or sound only, the term *music* or *sound* will be used.

1.9.3 IMMERSION

There is more than just a simple definition of this term. In general, it is meant as the act of immersing or the condition of being immersed such as covering or submerging in something. In the context of gaming immersion refers to the ability to mentally connect

and transport the players into the gaming world, while they are physically rooted on their couch. For the purpose of this thesis, it means the degree in which the player feels integrated, or absorbed with the game space (Taylor).

1.9.4 FIRST-PERSON SHOOTER (FPS)

The convention of a first-person shooter game is 'run and shoot' focusing on gun-based or projectile weapon-based combat in which the action is seen through the eyes of a protagonist and the player is encouraged to believe they are in the gaming world through devices such as perspective and real-time interaction with the gaming elements (Grimshaw, "Player Relationships" 74). As the name implies, it is commonly referred to as a FPS and is characterised by a first-person viewpoint and a heavy emphasis on combat, typically involving fire-arms. Removing the avatar from the player's field of view will make these games visually distinct from that of a third-person perspective, which associated with character-driven games which lock the player's and the avatar's views together. Furthermore, as stipulated by Klevjer, "Looking and targeting came together in the same movement, and the player was invited to, as it were, follow his gun" (Klevjer, "Gladiator", 1).

1.10 STRUCTURE OF THE THESIS

Overall, Chapter 1 provides the background or introduction to the thesis and will address the gaps in the research, objective of the thesis, and the research questions. This chapter will also briefly explore my theoretical framework and methodology, the scope and significance of the study conducted. Several key terms will be clarified to provide further understanding of the contexts used in this thesis. A literature review will be used to feature

relevant research on digital game audio in Chapter 2. A detailed discussion of the concept and definition of immersion and interactivity will be assessed by examining reviews of other scholastic research on similar topic. Chapter 3 will provide an in-depth study of the theory and methodology to further illustrate the application of taxonomy of game audio in the analysis of the audio and idea of immersion in the gaming. Chapter 4 will present the analysis of the games, the different roles of audio in providing gaming effects, and the ability to facilitate the immersion process of the player. Chapter 5 will discuss the findings of the research, and its potential use in the future. The conclusion will reiterate the observations and limitations of the research. In addition, it will also provide some points on how this research will contribute to other related areas in Game Studies, and the direction for future research on sonic events in digital games.