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**CREATING IMMERSION: A SEMIOTIC AND
COMPOSITIONAL INSIGHT INTO THE
PROMOTION OF IMMERSION THROUGH
VIDEO-GAME SOUNDTRACKS**

PETER GOOSEY

**A thesis submitted to the University of
Huddersfield in partial fulfilment of the
requirements for the degree of Master of Arts by
Research**

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Abstract

This thesis identifies key criteria of how immersion can be promoted and induced through musical functions within soundtracks of video-games. The thesis is the primary component of the research offering a usable framework tool for composers and researchers when composing, or analysing, a video-game soundtrack.

Popular and well supported immersion theories are presented to identify similarities and differences between approaches to immersion. Links between the most suitable theories are outlined whilst forming an immersion framework, used for the analysis of the case study: *Journey* (2012). Two scenes from *Journey* are examined in detail and analysed through the created framework, identifying the successful compositional techniques that aid the induction and promotion of immersion, through the soundtracks support of the narrative, controls and game design. This designed framework helps structure the analysis, as well as provide a more insightful method of dissecting the phenomenology of the player's response.

The thesis is accompanied with an original composition, scored for *Limbo* (2010), and was created with the framework to act as proof of concept. The score is self-analysed, identifying its effectiveness whilst expanding on compositional and technical strategies employed.

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Chapter 1

Immersion Theories and The Influence of Music on Immersion in Video-Games

1. Approach to Research

The following research is concerned with exploring and expanding upon several audio-visual immersion theories and the immersive impact of music in video-games, with the aim of developing a strategy to approach and identify immersive auditory qualities. I will consider how music is used within video-games to aid immersion and as a separate inducer of emotion and immersion.

The topic of immersion is one that divides academics and authors, depending largely on their field, but what is important is that it is acknowledged, albeit in varying forms. The scope of these fields has lead me to present four possible immersive conditions to question when discussing immersion, these are: stage of immersion; requirements of each stage; effects; and the form the immersion takes. Drawing from several semantic musicologists (Whalen, 2004; Cohen, 2000) this review will focus on three main reoccurring themes throughout this field of study:

1. Mood induction and communication of meaning through structures and narratives.
2. Distinguishing elements/levels of immersion.

3. How does the relationship between visual media and music within the game affect the overall immersion?

1.1.1. Immersion: Identifying the Invisible

Specific definitions for immersion vary drastically and this is one of the many minefields that must be traversed before identifying specific techniques used. However, at its most basic level, immersion can be divided into three over-arching stages: engagement (the game is accessible and the player wants to play), engrossment (emotions and attention can be affected directly) and total immersion (player is cut off from reality), with each stage requiring an increasing amount of active participation from the player (Arsenault, 2005; Brown & Cairns, 2004). The three terms have acted as a fundamental basis to quantify the depth of immersion and have been adopted as common terminology when discussing and identifying levels of immersion. The initial stage; engagement, can also be referred to as cognitive absorption (CA) and is described as a situational intrinsic motivator by Vallerand (1997) (Agarwal and Karahanna, 2000). Music in video-games focuses on non-linguistic sounds, leaving the cognitive processes that take place to be secondary to the player's conscious attention of the gameplay (Munday, 2007). As a result, the music and sounds act as a protective sonic 'wall' preventing distracting noise from entering the gaming world thus maintaining immersion (Cohen, 2000). Leading on from Cohen's work is 'presence', often signifying spatial presence, which addresses the feeling of being transported into another reality or environment and has the ability of taking place simultaneously whilst in another state of engagement, such as CA (Skadberg & Kimmel, 2004; Witmer & Singer, 1998). Caillois (1961) describes presence as 'imaginative immersion', claiming that much of the pleasure experienced by a person (within the video-game environment the player) comes

from them pretending they are someone, or somewhere else, allowing the player to transcend themselves; “One becomes absorbed with the stories and the world, or begins to feel for or identify with a game character” (Ermi & Mäyrä, 2005, p.8). A similar ‘sub-state’ of presence is ‘mythic immersion’, which describes a player’s transcendence, supported by ‘epic’ cinematic orchestral scores associated with the ‘mythic drama’ traditionally found in film and opera (Sexton, 2007). The music is seen as having the ability to bypass human defence mechanisms by giving off ‘epic’ impressions through the lushly scored soundtracks, for example, in the *Final Fantasy* series of games (Munday, 2007; Donnelly, 2005; Gorbman, 1987).

Several studies have been conducted to investigate the required mental stimuli for the stages of immersion to be engaged with. These result in a further three categorisations: sensory, challenge-based, and imaginative immersion, which is known as the SCI model; a method of identifying the effects that have caused immersion (Wilhelmsson & Wallén, 2011; Ermi & Mäyrä, 2005). Within the SCI model, the three categories (sensory, challenge-based, and imaginative immersion) each have their own causal effects. These are: curiosity, concentration, emotional involvement (mood induction), comprehension (communication of meaning), and control (Federoff, 2002). The opinion that specific prerequisites are required has support from a number of other multi-disciplinary academics and authors ((Brown & Cairns (2004); Chou & Ting (2003); Agarwal & Karahanna (2000); Witmer & Singer (1998); Sweetser & Wyeth (2005)). However, Jørgensen’s (2006) five functional aspects of computer game audio adds an further layer, providing a more suited basis for the medium being analysed. The five aspects been developed to identify the functions of video-game soundtracks and what information they provide about the gameworld. The five functions of

game audio are: action-related, atmospheric, control-related, identifying, and orientating (Jørgensen, 2006). According to Jørgensen, game audio will always fall into at least one of the five categories and in turn will determine how the player interacts with and disseminates the provide auditory signals (Jørgensen, 2006).

When relating to gameplay/game design, one of the most popular immersive theories is that of Flow developed by Csikszentmihalyi; a mental state of immersion, described as “a state in which people are so involved in an activity that nothing else seems to matter” (Csikszentmihalyi, 1990, p.3). The term is not specific to video-games and can be experienced whilst doing everyday tasks, however, is commonly used when relating to video-games. The work carried out by Csikszentmihalyi into Flow has become a well-established theory in the discipline of creative psychology, and the psychology of happiness, though has also been commonly used as a foundation for a large proportion of recent research into immersion (Csikszentmihalyi, 1990). It is identified by eight major components:

- A challenge activity that requires skills
- Concentration on the task at hand
- The merging of action and awareness
- The sense of control
- Clear goals
- The loss of self-consciousness
- Direct feedback
- The transformation of time

(Csikszentmihalyi, 1990)

In the article, ‘Flow in Games (and Everything Else)’ (2007), Chen (2007) (the director and co-creator of *Journey*) talks about the requirements needed to induce flow and provides several graphs and models in support of his theories. Chen explores the possibility of

creating a game that maintains the players' state of flow through adaptable gameplay. Pace (2004) states that one must have total involvement to be in a state of flow, unlike pure immersion that can take place even with a loss of context (Brooks, 2003; McMahan, 2003). However, this is disputed by, Sundbo & Sørensen (n.d.), who claim that the context of the game will still be subconsciously understood by the player and believe that context must be present in order for any type of immersion to take place.

Immersion within modern video-games is not achieved as a result of a single input from the medium to player, but instead is the resultant effect of a combination of factors in the game, as well as the way in which it they are interpreted. Studies into the specific aspects of the game design state that the audio is trying to pair itself with other interesting insights when considering the player's perception of the partnership between game design and audio. The inclusion of a framework purely focusing on audio design would be a useful method of dissecting and categorising the music video-games. In aid of this Huibert's (2010) Interface, Effect, Zone, Affect [IEZA] model provides four main categorisations when accessing the types of audio in the soundtrack and sound design. The four categories of the IEZA model are divided into two separate groups, activity: sounds that respond directly the player's actions, and setting: sound acting as a background in the game, generally not reactive to the players actions (see *fig.1.1*) (Huiberts, 2010).

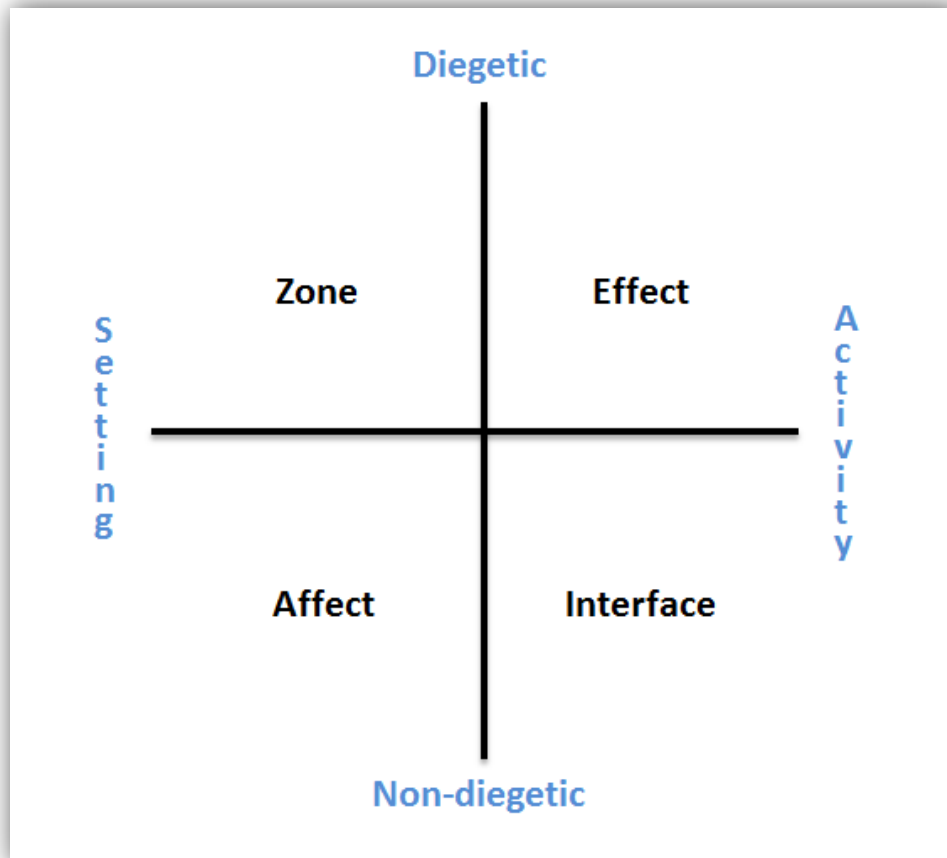


Figure 1.1. IEZA Model (Huiberts, 2010, p.25)

...audio makes the game understandable and can have a positive influence on immersion by improving understanding of the game information and lowering barriers. This is a very functional side of game audio. (Huiberts, 2010, p.30)

The IEZA model describes the in game music as having two overriding functionalities on the experience of the player. Huiberts notes that the in-game audio will either support the optimisation of the game (how the game communicates information from the game world to the player via sound), or it will help the games dynamisation (how well the sound creates an exciting experience for the player) (Huiberts, 2010). However, the two functionalities are not isolated from one another and can be present at the same time, enhancing the player's

experience by both providing information and increasing excitement. This could be an in-game sound, perhaps part of the environment or soundtrack, conveying information to the player, opposed to an isolated non-diegetic sound.

Curious to understand gamer's perception of video-game music on immersion, Huiberts conducted a study asking a number of gamers to describe when audio had negatively impacted their feeling of immersion during gameplay. The most common response (34.24%) showed that the "wrong type of music" (Huiberts, 2010, pp.52-53) had been used, stating the music, rather than other issues with the quality of the audio or voice acting, was wrong. When participants were asked how the audio had a positive influence on the immersion of a game, the most popular answer (32.1%) stated that the "audio enhances a change in pace, anticipates upcoming events or stimulates action-related tension" (Huiberts, 2010, p.52). When questioned about how music had positively aided immersion, the most popular answer given relates to the gameplay activity, specifically to a challenge-based type of immersion and by stating that a change in pace or anticipation of events has aided the immersion it is clearly showing that players are aware of changes in the music as well as its relationship and supportive role it plays for the gameplay. The second most popular answer given (26.3%) by the participants (this related to a sensory/imaginative type of immersion, often associated with presence) stated that the "audio constitutes an atmosphere or setting" (Huiberts, 2010, p.52). The audio that accompanied the challenge-based events on-screen was identified for having changing and clearly adaptive music, something that prompted a somewhat conscious response from the player.

Responding to the question on positive attributes of music on immersion, the following two most popular responses stated that the "audio contributes to the feeling of

presence or constitutes a world” (21.9%) and that the “audio induces or supports the player’s emotions” (14.6%) (Huiberts, 2010, p.52). In total, three out of the five responses relating to the positive immersive attributes offered by audio related to sensory or imaginative immersion (86 of the 137 participants: 62.8%).

1.1.2. Immersion Through Narrative

The narrative is one of the most important aspects of a game when engaging its audience as it will either pull a player into the gameworld or push them away from it, regardless of whether the controls are sleek and intuitive. The SCI model shows emotional involvement as a key element of immersion and it is through the narrative that this is often achieved (Pace, 2004). Three different types of narrative are set out by Qin et al. (2009): interactive, structural and immersive, and can be viewed sequentially leading from one to the other as immersion increases (Federoff, 2002). This is supported by the application of diegesis in film and drama studies by Gorbman (1987), though since has been adapted in order to compare the narratives and levels of interaction that are found in video-games (Collins, 2008). Diegesis is key to highlighting the differences between the non-linear/linear structures in film and video-games, although the interactive nature of video-games is one of the vital differences that distinguish diegesis from other mediums, such as film (Collins, 2008). The inclusion of interactivity provides the player with an increased level of curiosity and freedom, however, it is also possible for the apparent lack of narrative in video-games to allow the player to apply their own meaning, leading to a much more personalised experience. Although a widely accepted term, Jull (1999) does not favour the term ‘narrative’ as a description for the contents or structure of a video-game, arguing that the

term does not represent the interactive nature of video-games and believes it suggests a limitation in the freedom of the player through reduced choice and control (Juul, 1999).

Previously video-games were thought of as a lesser medium, unable to create the experiences that a book or film might, due to their focus on motor-skills and overtly traditional stories and themes (Juul, 1999). However, Munday (2007) comments that in modern video-games the opposite is true, stating:

Videos games do not micro-manage their narratives in the way that films, plays or novels do (in fact, bad video-games are criticised for doing this). (Munday, 2007, p.61)

Like Munday, other academics, such as Kane (2003) and Desurvire et al. (2004) favour the opinion that in order for the player to have the best chance of becoming emotional involved in the narrative, and with it the possibility of total immersion, they must be given choices (Kane, 2003). By providing choices the gaming environment becomes more believable (Desurvire et al., 2004).

1.1.3 How Do We Hear Immersion?

At the most fundamental level, immersion in video-games is the consequence of a successful relationship between visuals, audio and the perception of the receiver. The intent of the audio must be well prepared and communicated to the receiver, in order to ensure that the codal meaning is not disrupted or misinterpreted. By influencing receiver's perception of the audio it increases its possibility of it having the desired effect. How the receiver interprets a piece of audio separate to the visuals was originally explained by three modes of listening (see *fig.1.2*) (Chion, 1994).

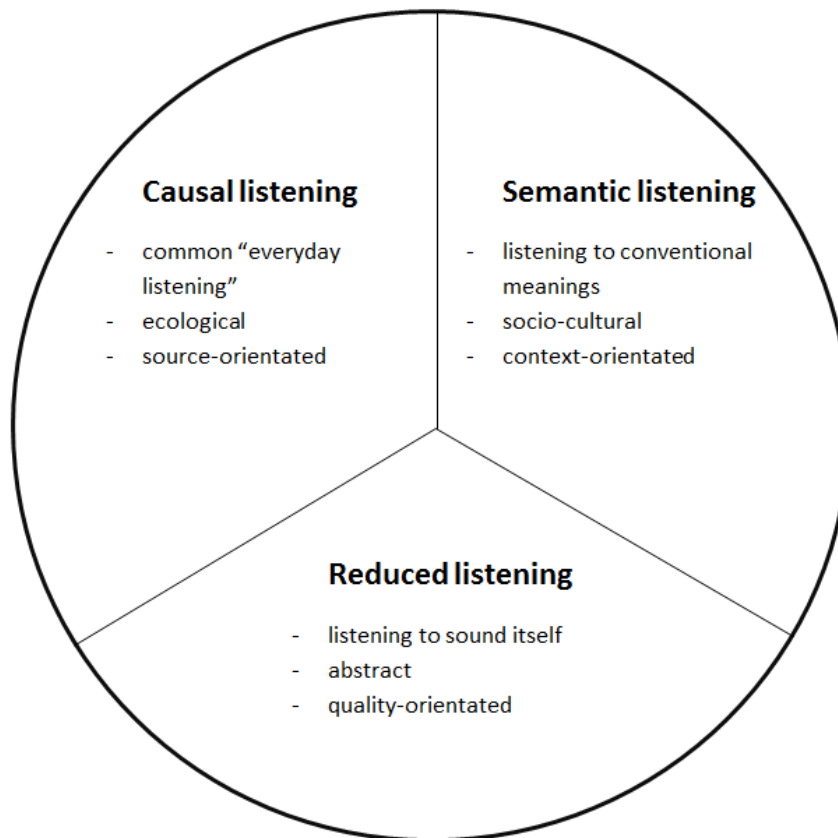


Figure 1.2. Chion's three modes of listening (Chion, 1994)

The modes of listening are divided into three perceptual types: causal listening (listening for the source of a sound or its literal meaning), semantic listening (decoding the message of something heard), and reduced listening (focusing on qualities of sound separate to its meaning). Movement between the modes is possible, and as a result, all three can be experienced simultaneously, although the state in which the listener will hear audio is dependent on several factors, including: instrumentation, perceptibility to audio and harmonic treatment (Chion, 1994). The situation, type of sound and context will directly affect which mode is used to interpret the sound. It is also suggested that the effect of the audio can be so influential it will actually determine the meaning of what is on screen, reinforcing the opinion that both image and audio are mutually implicated (Chion, 1994). However, the establishment of Chion's three listening modes, a more comprehensive

model, developed by Huron (2002), has since been compiled that includes six modes of listening (see *fig.1.3*).

Reflexive System	Fast physiological responses
Denotative System	Processes which allow listener to identify to identify sound sources
Connotative System	Processes that allow listener to infer various physical properties and passively learned associations (e.g. from temporal patterns)
Associative System	Arbitrary learned associations
Empathetic System	Allows the listener to perceive cues that signals someone's state of mind (an agent causing the sound)
Critical System	Reflective self-monitoring concerning the verification of perception and the appropriateness of one's responses

Figure 1.3. Summary of activating systems (Huron, 2002)

The model was created to explain the auditory-evoked engagement a listener will have with a sound source. However, according to Tuuri et al. (2007) it can also be used to explain other kinds of meanings by offering complementary perspectives to the three listening mode model (Tuuri et al., 2007). Huron's inclusion of a connotative system lends itself much more favourably to interactive media, a possible shortcoming of Chion's model (Turri et al., 2007). The interactive nature of video-games allows for the inclusion of: diegetic/non-diegetic/trans-diegetic, dynamic/non-dynamic and adaptive/interactive sounds, however, this will depend on the internal structuring and style/genre of the game (Collins, 2008).

1.1.4. Identifying Musically Prompted Emotional Responses

The interpretation of sound within video-games will ultimately prompt an emotional response, in some form. Emotional responses from the player initiated through character development and narrative are divided into two types: primary and secondary emotions; primary emotions refer to the on-screen actions (a sad death scene), whilst secondary emotions reflect the player's response to what is on-screen (same sad death scene may cause anger) (Sonnenschein, 2001). A player will often approach a game with the intention of experiencing the emotions of the main character, making it essential for video-games that work on this basis and rely on imaginative immersion to pair the primary and secondary emotions (Lazarro, 2004; Huiberts, 2010). Although primary and secondary emotions are related to the character development and narrative, the music will be essential to make sense of, and build an emotional attachment to both (Cohen, 2000). Though, the purpose of the audio will largely depend on the genre of the game, whether it is trying to pair both primary and secondary emotions (identification music), or trying to place the player separate to the primary emotions of the character (spectacle music) (Gorbman, 1987). A typical example of this would be the protagonist slipping on a banana skin, whilst the primary emotion of the character may be one of shock, the secondary emotion portrayed through the music would be humour.

The emotional and semiotic power of a video-games soundtrack is fundamental when conveying emotions and moods. In Lissa's *Ästhetik der Filmmusik* (1965), a number of musical functions are presented that Lissa believes to be vitally important to make the on-screen visuals more engaging for the viewer. Many of these functions have helped construct a foundation from which later work on semiotics by popular musicologists, such as Tagg,

have been developed from. Whilst many of the musical concepts, that Lissa has presented, have been updated and expanded upon, many of the functions in this area have remained as core fundamentals and provided important developments into the understanding the techniques and motivations of video-game audio today. Although at the time of writing Lissa was referring to film, video-games can apply the same process to the music when using adaptive audio to create similar effects. This is often seen in linear horror and thriller games which have a strong focus on the narrative rather than the ludo aspects. By employing changes in the function that the in-game music serves, it becomes possible to prompt varying modes of listening from the player, increasing their engagement and connection with the game design (i.e. mechanics, controls, aesthetics). For instance, the anticipation of subsequent action through on-screen music is considered hugely important and often used when creating suspense and tension before an event is shown.

The ability for a video-game to evoke emotional responses from the player is a powerful device, one that is enhanced by the physical control players have. For the player to have a strong attachment to the on-screen events, an emotional basis must first be established by creating an atmosphere, additionally, the expression of the on-screen characters emotions through the music can be one of the most significant references from which the player can base their emotional response on. By either supporting or influencing the player's reaction to the on-screen emotions it will play a pivotal role when determining the player's subsequent emotional reactions to the gameworld.

The games choice of music and the type of response the music is attempting to encourage from the player has a strong influence on the overall mood by exploiting both the conscious engagement the player will actively have developed and the unconscious

influence the music will have. This could support a theory that 'lean-forward' games (i.e. first person shooter's) demand our attention and concentration, while 'lean-back' games (i.e. city builders) promote relaxation and passivity (Bogost, 2011). Bogost describes the promotion of lean-back qualities as 'Zen-like immersion'. In support of this, Pedersen et al. (2008) identified a direct correlation between material, loudness (dB) and the participant's mood, an affect that can be explained semiotically through a communication chain, in order to systematically explore ways in which the score is transmitted and received by the listener (or player) (Tagg, 2012; Pedersen et al., 2008). Tagg's work within the field of semiotics uses an inter-disciplinary approach and focus's not just on the structure or content of a piece of music, but also largely on its purpose for listener. Tagg's (2013) communication theory divides the emitted sounds into hierarchical musemes based upon their perceived interpretation with the receiver. However, Collins believes that since the levels of signification specifically found within video-games have been examined a new form of communication chain may be needed in order to explain the possibility of the player acting as a co-transmitter. The communication chain, although not developed to be used to analyse relationships in video-games, creates issues when interpreting how each of the levels are decoded by the player, however, the communication of emotional meanings might be addressed by two possible outcomes: communication of emotional meaning, and mood induction (Rosar, 1994; Federoff, 2002).

1.1.5. Game Design and Music Induced Immersion

The focus of my research will revolve around the application of a soundtrack and identifying the player resultant interpretation. However, in order to accurately understand the cognitive processes of the player towards the game, one other area must be observed;

attention theory and its relationship with game design (Lemarchand, 2012). Lemarchand's research pinpoints three categories within a video-game that a player will focus their attention, including: their ability to get and maintain their attention by describing them as 'grabbers and keepers'. The three categories are: aesthetics, narrative and ludism. The techniques designed to maintain a player's attention have been developed from established theories, such as Golden Ratios and the Fibonacci sequence, common resources used in AAA titles, such as *Uncharted 3* (Lemarchand, 2012). However, causal factors specific to attention are also covered; methods of acquiring attention, such as: reflexive (no/little control over it), and executive (player has the ability to direct), are discussed. From a musical viewpoint this method of framing any changes in attention types is an accessible and directly relatable method to evaluate the relationship between music and visuals.

1.2. Continuation of Research

The review of literature in this chapter has attempted to highlight the specific immersion and the surrounding theories that I will be drawn from throughout this research. Future research must focus on understanding the way in which player's break down the codes and techniques found in video-game soundtracks and make it as much a priority as defining immersion itself. Both visuals and audio seem to play mutually complementary roles within the process of immersion and for total immersion to take place, both must be present. When looking critically at the affect music has on immersion within video-games it shows developing a method of qualitatively observing music and the compositional decisions would be a necessary and useful analytical tool. This thesis continues by looking how the application of compositional techniques, functionalities of music, attention of the player, and immersion types could:

- Be amalgamated to develop a single intuitive framework to be used as a tool for composers and researchers
- Used to aid compositional decisions when writing an original soundtrack
- Used retrospectively to self analyse the effectiveness of a combined model for composition.

Chapter 2

Method of Analysis to Identify Immersive Functions in Video-Game Soundtracks

Immersion is regarded as a key factor when considering the success of a game/player relationship, so in order to understand the elements within video-game music that contribute directly to the immersive state of a player, this chapter will offer a scope of literature, outlining the priorities. To test the suitability and effectiveness of the model, constructed in this methodology, I will be examining the 2012 indie game, *Journey* (2012) by Thatgamecompany; an artistic indie style game set in an expansive fictional desert, focusing on richly coloured environments.

Developing a reliable quantitative method of measuring immersion is a topic widely researched topic, not only in the games industry but also in; the film industry; and mobile and computer application market (Chen, H., Wigand, R., & Nilan, M., 1999). The possibility of having a product that successfully immerses the user is a highly desirable prospect, as it will almost certainly make the user more likely to spend longer amounts of time using the product, while increasing the possibility of regular use. As video-games quickly evolve, the medium has attracted a following comparable to that of television, with 33.5 million people in the UK (69% of the population) playing video-games regularly (Stuart, 2014). Across all platforms, the video-game industry was worth an estimated \$91 billion worldwide in 2015, with its' worth predicted to increase to \$107 billion by 2017 (Campbell, 2015).

Due to the demand for immersion within today's industry, video-games are marketed as being immersive and judged in reviews on their ability to induce immersion for the player. In the effort to identify the key immersive inductors of video-game music, the methodology will have two objectives. The first is concerned with scrutinising some of literature to unpack the strategies that focus on the compositional techniques that aid immersion, offering the chosen theories which will be used to make the theoretical framework. The second objective is to show the completed framework and elaborate on the value and contribution it will offer when guiding my research on *Journey*.

2.1. Journey and Immersion

At the time of its release, *Journey* received an extremely positive reception, winning a number of prestigious gaming awards, including: game of the year by IGN, GameSpot and D.I.C.E., as well as best original music at the 2013 British Academy of Film and Television Arts Awards. In 2013, *Journey's* soundtrack was the first video-game ever to receive a Grammy nomination for Best Score Soundtrack for Visual Media. Through this exposure, *Journey* created a milestone by bringing itself into focus alongside blockbuster movies, cementing its position in popular video-game culture. It is because of this, its artistic design and captivating music that has caused *Journey* to receive increasing attention from the Ludomusicology community, all interested in exploring what makes it such an engaging and immersive experience. However, in order to determine what aspects of the in-game music create such an immersive experience for the player, it is important to first identify exactly what is meant when referring to immersion.

Reviewers of *Journey's* soundtrack commented on the transcendental experiences triggered by the score that when paired with the game will bring you to tears (Saunders, 2015; Southall, 2013). Looking at a review of, *Journey*, by MacDonald (2012), it raises an interesting correlation between the reviewer's experience and the definition of immersion by Murray (1997), in which she defines immersion as: "...the sensation of being surrounded by a completely other reality that takes over all of our attention" (Murray, 1997, p.8). MacDonald remarks:

You will rarely play a game that makes you feel so much like you're actually there as *Journey* does. There is not the slightest inconsistency in its art direction, and this, together with extremely clever sound design and natural signposting, absorbs you in the game's world entirely. (MacDonald, 2012, para.5)

The model I have suggested, offered in this chapter, will be used to try and identify contributors of immersion, and so to test the model and propose my own creative strategy for identifying immersion properties, I will be offering an analysis of two scenes from *Journey*; 'Graveyard – The Call', as well as part of, 'Canyon – The Road of Trials'. Both scenes are hugely predominant and influential moments of the game. However, this analysis is not intending to suggest that the music for *Journey* was created with formalised immersion theories in mind, but aims to contribute to a theoretical discourse on the understanding and contextualisation of game soundtracks, focusing on the resultant audio-visual relationship. The second section from *Journey* is: *Scene 2: Canyon – The Road of Trials*, from the fourth environmental setting of the game, around 30 minutes in.

2.2. Breakdown of Analysis Models Used

Each of the five individual sections of the theoretical immersion framework will be unpacked to highlight their value when accurately pinpointing compositional techniques and their ability to induce immersive states, before presenting the framework as a whole.

2.2.1. Video-Game Attention Theory

To fully understand how a player is interacting with the music of the game, it is of vital importance to acknowledge and recognise how a player is interacting with what is on the screen in front of them and the interaction it will have with the music. To do this, I included the work of Lemarchand (2012), the only on-musical or aural theory I will be including, placed onto the initial of the chart. I was recommended to explore Lemarchand's work by Austin Wintory after I approached him via email to talk about the creation of the game; Wintory believes that a large amount of the Journey's success can be accredited to the game design's focus on attention theory principles. On-screen actions have the ability to directly affect the player's interaction to the music within the game; to ignore this connection would result in the music being treated solely as a piece of music and not as music for a video-game. Although attention theory only relates to the visual design of a game and does not comment upon any audio-visual relationships, I believe that both immersion and attention have the ability to co-exist interdependently. Furthermore, whilst acting interdependently, it is also my belief that for full immersion to take place the player must have their attention maintained by the game design. Perhaps a systematic change in the player's mode of listening could improve their ability to maintain attention on the game world, and in turn, increase the possibility that immersion may be reflected or echoed by Lemarchand's research on maintaining a player's attention through game design.

Although Lemarchands work takes account of the video-games design it ignores the role that the game's music plays in maintain and supporting the gameworld and offers no insight into the audio-visual relationship within games. Lemarchands attention theory addresses three aspects of video-game aesthetics that the player will be paying attention to at any one time, these are: aesthetics, narrative and ludism. Each has the ability to acquire and maintain the player's attention in different ways however, each will be suited to either 'grabbing' or 'keeping' attention and thus must be used effectively within the game design. From a musical viewpoint this way of framing any changes in attention types is useful for evaluating the relationship between music and visuals. For example, when analysing *Journey's* soundtrack it will be important to consider in what way the player's attention to the on-screen visuals and game design have the ability to directly affect the perception and role of the music. To ignore this connection might result in the music being artificially divorced from other sensory inputs, not as a single artifact. Lemarchand's three part system is a very useable and intuitively presented system for both game designers and scholars and offers additional insight when paired with a musical system that addressed some of the common traits utilised by composers to maintain player's immersion.

2.2.2. Jørgensen's Five Musical Functions

Jørgensen's (2006) five musical functions will be a core component when identifying key compositional functions in *Journey's* soundtrack. At any one time the score can be divided into one of the five categories based on what semantic functions the music is using to relate to the gameworld. The five functions are as follows:

- **Action-Related** - reactive or proactive audio related to the characters physical action. Associated with promoting the on-screen actions events by creating a more exciting experience for the player (Jørgensen, 2006).
- **Control-Based** – this function has the ability to alter the players control over a situation and is any sound that can be interpreted as communicating information too difficult to visual communicate. Audio in this function can also relate to the motor skills of the player or reaffirming the game controls and/or complimenting the correct practice of the game controls (Jørgensen, 2006).
- **Atmospheric** – any audio relating to, or representing, a specific location or situation that the player inhabits. This audio can be utilised to support the relatability the player may feel with the world through increasing the empathy they feel to the gameworld (Jørgensen, 2006).
- **Orientating** – audio communicating the location of an event or object outside of the player's field of view to provide the player with a greater understanding of their surroundings through a cue other than visual one (Jørgensen, 2006).
- **Identifying** - audio that provides value to an object in the gameplay, through auditory icons and earcons. This is often used to communicate information in a more intuitive manner opposed to using written text (Jørgensen, 2006).

The functions relate more closely to the creation of audio from a compositional and design sense, opposed to a psycho-acoustic one, and in turn will help offer a composer orientated perspective when used to analyse the music of *Journey*. By viewing the functions, there are obvious links to the visual design of the game as they relate directly to the gameworld. After

identifying the attention type the game is promoting to the player in the first level of the framework, the musical functions that are supporting this can be identified.

Although the presentation takes into account the video-games design it ignores the role that the game's music plays in maintain and supporting the game and offers no insight into the audio-visual relationship within games. Lemanchard's three part system is a very useable and intuitively presented system for both game designers and scholars and could offer additional insight paired with a musical system that addressed some of the common traits use by composers to maintain player's immersion.

2.2.3. Sensory, Challenge, Imaginative Immersion Model

The sensory, challenge-based and imaginative [SCI] immersion model looks holistically at the combined aspects of the gameworld and soundtrack, interpreting how the player will mentally process the stimuli psycho-acoustically (Ermi and Mäyrä, 2005).

- **"Sensory Immersion"** occurs when there is a sufficient level of sensory connection experienced between the game and the player (Huiberts, 2010, p.45). This can be divided into two categories, 'sensory gratification' (i.e. appealing audio, perceived depth of audio) and the feeling of 'presence' (convincing audio of the gameworld, level of in-game detailing) (Huiberts, 2010, pp.55-56).
- **"Challenge-based Immersion"** relates to a game's incorporation and requirement of adequate motor and cognitive skills (Huiberts, 2010, p.46). The game design, pacing, use of intuitive controls, structure and the game's ability to use the audio to either drive or dictate the gameplay will affect the player's possibility of becoming immersed.

- **“Imaginative Immersion”** is made possible when the player feels a sufficient amount of empathy to the gameworld around them (Huiberts, 2010, p.50). Empathy can be provided through; the story (use of primary and secondary emotions); setting (in-game affects and a convincing world setting); or the characters/events (voice acting and the player’s response to sounds). A successful relationship between imaginative immersion and sensory immersion can create “a feeling of presence in the gameworld” (Huiberts, 2010, p.52). Presence addresses the feeling of being transported into another reality or environment and has the ability of taking place simultaneously, whilst in another state of engagement (McMahan, 2003). Both presence and imaginative immersion require an emotional investment from the player towards the character or the story of the game (Huiberts, 2010).

Following on from the previous levels the SCI model will allow for the prerequisites of immersion to be pinpointed in the score, as well as associated to the specific type of immersive state.

2.2.4. Musical Stages

As an additional method of identification to Huron’s six modes of listening, I offer three ‘musical stages’. Created to identify the resultant role of the music after interpretation by the player, opposed to the methods they will use to interpret it. I have chosen this method of identification as useful tool to understand the purpose of the music at the chosen moment in the game. The three musical stages are:

- **Musical Establishment** - In this initial stage, the player will be introduced to the music, this could be at the beginning of a game, a new scene, or simply a change in

the music. The focus of the player here is on the nature of the content or the identification of the music's general qualities, in an attempt to familiarise themselves with the aural environment. Music that has already been presented previously in the game may already be familiar to the player and as a result been associated to a particular emotion or aspect of the game and as a result cannot be considered as 'musical establishment'.

- **Musical Indication** - After a period of familiarisation with the music, the player will either be presented with music that, now they're accustomed to the aural environment, will identify the purpose of the music, what is being conveyed and begin decoding the music. The development of the player's link to the music will allow them to consciously or subconsciously understand communication of meaning through the music (Federoff, 2002). This stage occurs to create an attachment between the player and the game world, developing a connection between primary and secondary emotions. However, the rate at which a player may move to stage will depend on several factors such as their receptiveness to auditory stimuli, readiness to engage, as well as the handling of musical content.
- **Reflective Music** - After the foundations of the previous two musical stages have been established the player has the possibility to develop a physical or emotional link towards the game and no longer requires a prompt from the in-game music. The music in this stage will be reflecting the player's emotional state, opposed to the player feeling what the music is signifying. The emotional state of the player, if correctly prepared, will be heightened by the introduction of the music, creating the sense of the music happening in 'real time' to the player and aiding the

personalisation of the experience, supporting the player's mood induction (Federoff, 2002). For this stage to take effect the player must at least be in the engrossment stage of immersion due to the emotions and reaction of the player being directly affected, in addition, the attention of the player must also be sufficiently maintained (Arsenault, 2005).

When analysing a video-game's accompanying soundtrack through a compositional and psycho-acoustic lens, the use of listening modes to determine the player's perception of the music is problematic and will only ever offer a vague possible answer. In the hope of providing a more composition related method, the stages focuses on what material the player has or has not heard previously in the game and are designed to look at what the resultant effect the music is trying to have on the player, not just on a localised level (functions, attention, etc.), but how the music is developing throughout the game and creating an immersive aural environment. This is the importance of the musical stages and arches over the process of identifying and naming the individual inputs, instead identifies where the player is in the game and the effectiveness of the music over the players responses and suggests whether it has the ability to have an effect on them or not. This method of identifying the over-riding function of the music is not intended to be used as a means of further understanding the resultant reactions of the player to the music, but instead as a compositional framework.

2.2.5. Theoretical Immersion Framework

In order to conduct a systematic analysis for each of the chosen scenes, a framework has been developed; (see *fig.1.2*).

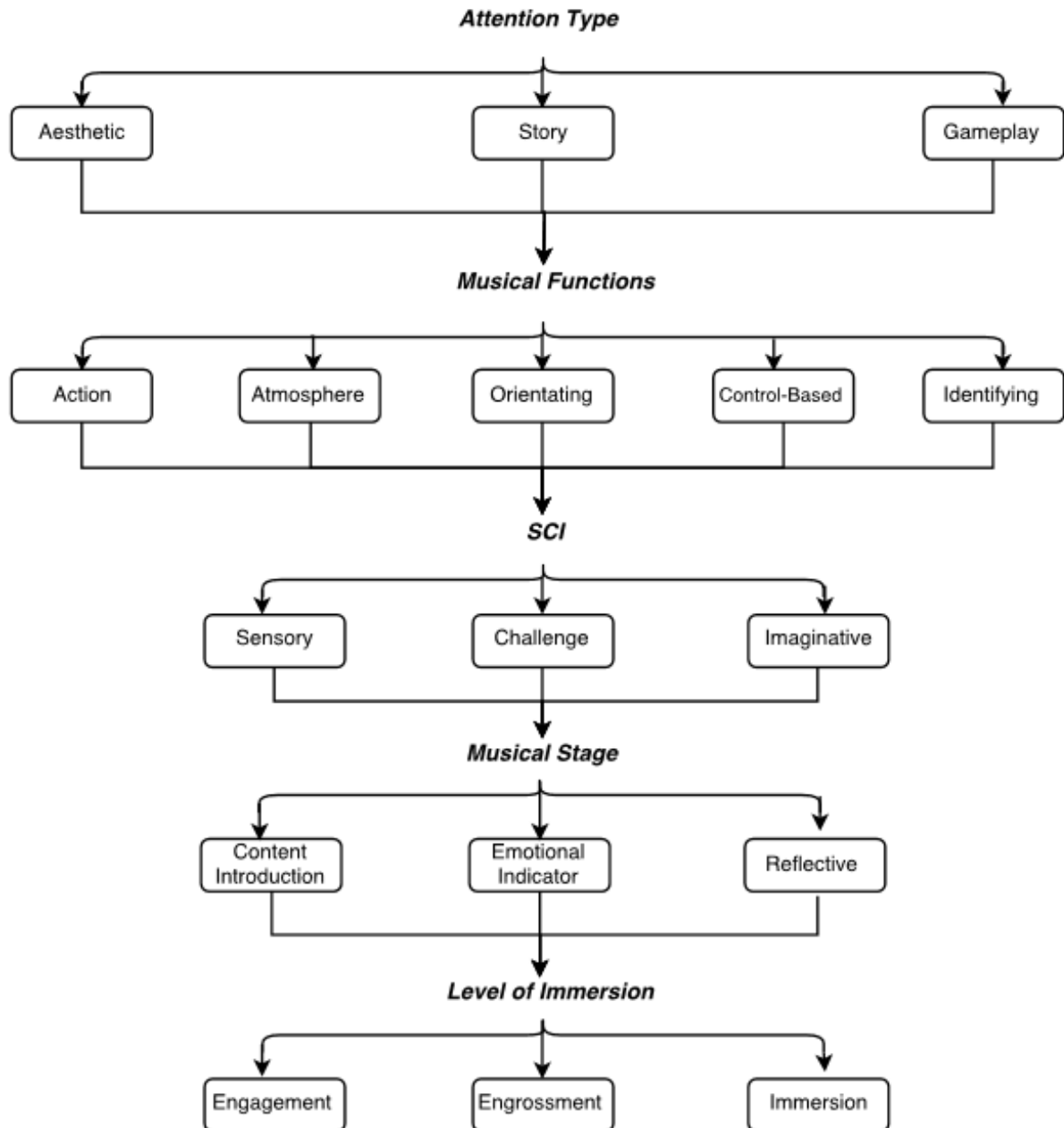


Figure 1.2. Immersion Analysis Model

The framework is intended to first identify what aspect of the game design the music is supporting and what affect this will have on the player's focus and attention, before considering how the player will interpret all combined inputs and finally concluding by identifying the resultant level of immersion. By providing the differing aspects of immersion in this manner, the framework allows for itself to be followed as both an analytical and compositional tool. The framework consists of the following models and theories: Attention

Theory (Lemarchand, 2012), Musical Functions (Jørgensen, 2006), SCI model (Wilhelmsson & Wallén, 2011), my own offering of 'musical stages', and finally Levels of Immersion (Brown & Cairns, 2004).

2.3. Conclusion

The development of a standardised method of analysing the immersive properties of video-game music requires the culmination of previous research to be collected and newly utilised. The approach I have developed already includes existing methods of video-game analysis while applying new variations of analysis methods previously seen in film and popular music, resulting in a combined framework. The model is to be used as a useful method of analysing video-game soundtracks for research purposes, however, it could subsequently be employed as a compositional tool to be used when considering which specific properties the music could contain when trying to creating an immersive set of work. For this reason, it will be essential to establish the specific immersive effects of *Journey's* soundtrack before writing my own composition. This will hopefully contribute a deeper understanding and manipulate the conditions in future games, though this will change from person to person not only based on their experience of games, but also on the cultural conditioning the player has experienced. The development and application of a structured framework, that acts as much as a compositional tool as it does an analytical one, will be the first stage of my research. In the following chapter, I will use this chart to analyse *Journey* before composing an immersive soundtrack in order to field test the frameworks effectiveness.

This chapter has highlighted the necessity to observe and pinpoint the specific immersive effects of *Journey's* soundtrack before leading to my own compositions. This contributes a deeper understanding of the application of musical functions on video-games and may influence changes in the musical conditions found in future games. The development of a structured model: that acts as a compositional tool, as much as it does an analytical one and establishment of this will be the first stage of my research. Once created, I can then use this model to begin the creation of a new set of immersive compositional works whilst testing its effectiveness from practical application.

Chapter 3

The Immersive Influence of Journey's Soundtrack: A Semiotic Insight

This chapter is concerned with investigating the influence of music and immersion within the soundtracks of video-games, from a compositional and ludomusicological perspective. As a composer, I am uniquely placed to explore these ideas phenomenologically, however, a mixed method research approach will be engaged with drawing on musicology theory for an analysis of how immersion is shaped through *Journey's* (2012) sound and music, accompanied by a personal exploration of techniques as a composer. As a composer my insight is qualitatively rich and adds value to the range of questions and challenges that will be made visible, through deep and engaged practice. In support, this analysis will be guided by the theoretical immersion framework that I offered, as well as, the research of: musicological, semiotic, ludomusicological and game theory researchers, as well as game designers.

The term immersion, especially in video-games, often divides the opinions of researchers and developers, though, these debates often query the terminology used opposed to the causal effects of the resultant states. Despite immersion being a quickly developing area of research within the video-game community with a high volume of papers investigating design features causing immersion, very little work has been carried out that considers video-game music through a qualitative lens. Whilst current research focusing on the audio and game design from technological perspectives is theoretically informative, the main priority of this thesis is to understand and identify the process of inducing immersion

in video-game soundtracks. Little research has been done, however, on exploring how video-game music has been written to aid a player's immersion during gameplay; Karen Collins explains:

...what methods can we use to determine how players hear, use, and interpret game audio? I can provide no answers at this time, but this is clearly an area that needs significantly more research. (Collins, 2008, p.171)

Theories discussing spatial immersion and cognitive absorption do not address the score directly, instead view the player's exposure to sound holistically as the main scope of their research. So, to understand the relationship between music and immersion, on a concentrated level in video-games, future research needs to investigate deeper than the players' exposure to sound to pinpoint how music is utilised and paired with the gameplay, in order to interact and enhance the immersive state experienced.

Drawing on Janet Murray's definition of immersion; "...the sensation of being surrounded by a completely other reality that takes over all of our attention" (Murray, 1997, p.8), arguably correlates with the MacDonald's review of *Journey*. However, it raises the question of: how do we know when we are playing something and when we are using something? Usually this question is asked when discussing the content of mobile apps – something that masks its primary purpose with some sort of game or activity, however, is it possible to have a non-serious game that whilst entertaining, has a primary role other than pure entertainment, or perhaps the role of the game depends on the intentions of the player? These questions, I believe, will be asked more frequently in the future as the role of video-games adapts and expands within society, though, for now, I will start by semantically exploring the role of the Grammy nominated soundtrack found in *Journey*, composed by Austin Wintory.

3.1. Analysis of Scenes

As state, the focus of the analysis will revolve around three reoccurring points of interest:

1. Mood induction and communication of meaning through structures and narratives.
2. Distinguishing elements/levels of immersion.
3. How does the relationship between visual media and music within the game affect the overall immersion?

3.1.1. Scene 1: *Graveyard – The Call*

In an online video posted by, Wintory (2013), the full soundtrack is accompanied by annotations elucidating his thoughts and the intention of each track, whilst offering compositional insights. Wintory reveals the purpose of *Journey's* opening scene, explaining:

The idea behind this opening sequence, and the enormous musical crescendo, was to essentially wipe the emotional palette clean. One big surge that leaves the player blank as a canvas. (Wintory, 2013, 02:34)

Journey begins from a position that allows the player to be influenced by the game, with their emotions being dictated subtly from the very beginning. The process slowly builds in emotional intensity in order to develop a strong bond between the influencing functions of the game and the player's interpretation of the aural indicators. When cross-checked with Chen's graph of emotional intensity (see *fig.3.1*), it seems that the intensity of the game develops these emotional foundations from a neutral position from the beginning.

The communication of emotional meaning in *Journey* was explained by Chen (2013) at the annual Design, Innovate, Communicate, Entertain (D.I.C.E) Summit; an event designed to bring top video-game executives together to discuss the latest initiatives in game design. During his keynote speech, Chen presented the ways in which he wanted the emotional content of *Journey* to change from level to level (see *fig.3.1*). He designed a chart with the stages of emotional intensity as a reference for the game designers and Austin Wintory (composer of *Journey*), explaining how the team negotiated the subjective-ness of emotional content (Chen, 2013). In this thesis, the graph was used as a guide and provided structure when considering the purpose of the music and the relationship between music and emotional response desired.

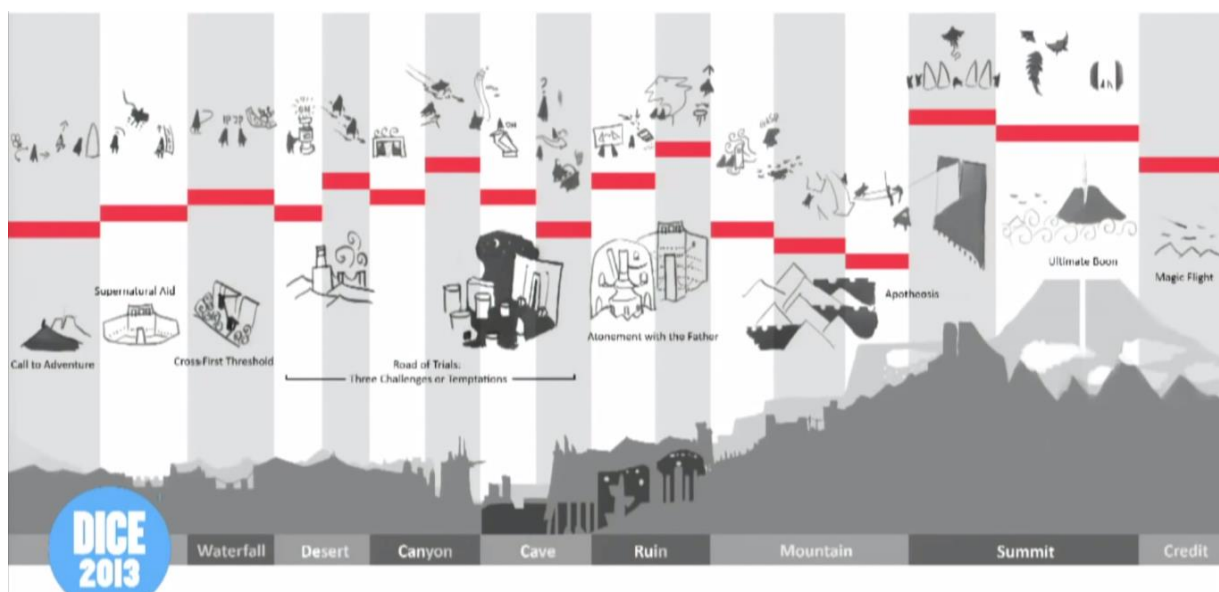


Figure 3.1. Emotional intensity graph (Chen, 2013)

During the opening scene of the game, no control is required by the player as they are shown several dynamic shots of the environment. No information has been provided for the player up to this point and no prior knowledge of the game, its setting, or content is required. The first discernable melodic phrase the player is confronted with is the main musical theme, played by the cello (see *fig.3.2*).

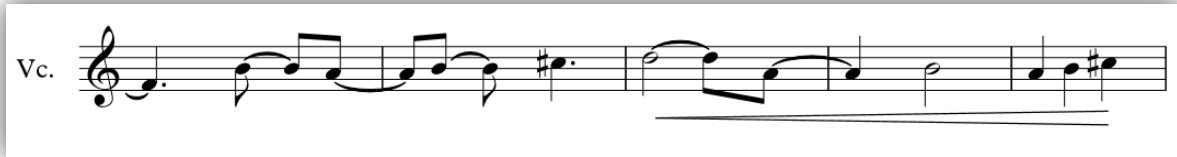


Figure 3.2. Extract from: *Graveyard – The Call: Scene 1*; bb.10-14, Transcribed by Peter Goosey, 2017, from *Journey Live score* (Wintory, 2015, p.9)

The melody is simple, foregrounded and immediately audible though the textures accompanying it. Straight away the main theme is being developed as an earcon, although the player will not yet be aware of it (Jørgensen, 2006). Earcons are typically used in extra-diegetic music and represent a change in the narrative to the player and are often intended to influence the player's mood or increase the emotive qualities of the game (Jørgensen, 2006). Earcons, such as this, have to be interpreted over time and so at this point in the game, Wintory, has decided to utilise the music as an earcon without the player even becoming aware of its presence. Initially the main theme will not provide any functional value for the player to immediately decode, however, through repetition and clever artistic direction its semantic influence will increase to a point at which it is recognised by the player for its purpose. This will support the gradual induction of the player into an immersive state by prompting them to focus their attention onto the aesthetics of the scene which will be easily acquired at the start of the game, due to its ability to 'get' attention, though struggles to 'hold' it over time (Lemarchand, 2012) (see *fig.3.3*).

beauty	story	gameplay
aesthetics	narrative	ludism
contrast	social	systems
gets ★★★	gets ★★★	gets ★☆☆
holds ★☆☆	holds ★★★	holds ★★★

Figure 3.3. Ability of acquiring and maintaining attention (Lemarchand, 2012, p.69)

Furthermore, due to the short duration of the opening sequence, any drop in attention, due to boredom, or attention fatigue should be avoided. By providing environmental shots of the gameworld that the player must become accustomed with, *Journey* is presenting a visual setting to establish familiarity and orientation with the game's settings, as well as gaining the player's attention through the aesthetics of the environment. Referring back to the three mains areas of interest in this thesis, the visual stimuli (i.e. gameworld) and the soundtrack are actively being encouraged to be viewed as codependent stimuli for the player, supporting the effectiveness of one another to promote immersive qualities. Neither inputs are encroaching on the others

As the scene progresses, the acousmatic wind sounds that introduced the scene diminish and short musemes emerge from through the textured layers of the score come into aural focus, beside the main theme (see *fig.3.4*). Acousmatic sounds; refers to a sound that is heard without the origin of the sound visible, for example artificial wind, has the ability to potentially alter the behavior of the player and serve an important role in video-games and are described as 'referents of reality' (Munday, 2007).

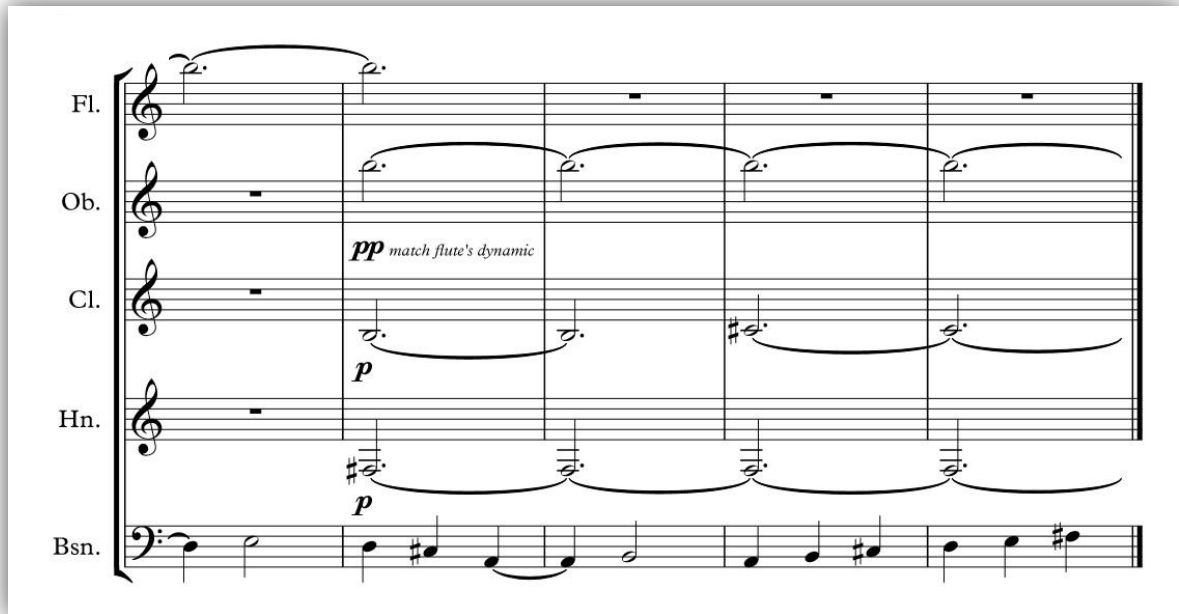


Figure 3.4. Extract from: *Graveyard – The Call: Scene 1*; bb. 20-24, Transcribed by Peter Goosey, 2017, from *Journey Live score* (Wintory, 2015, p.11)

The short musemes introduced are brief motifs contained as 'cells' within the violin and viola, their introduction is indicated by an 'as fast as possible' instruction, resulting in conflicting polyrhythms between the cello and double bass, as well as each other (see *fig. 3.5*).

The image shows a musical score extract for four instruments: Violin (Vln.), Viola (Vla.), Violoncello (Vc.), and Double Bass (Db.). The Violin part has a measure with a fermata and a subsequent measure with a rapid sixteenth-note run marked 'mp' and 'repeat as fast as possible'. The Viola part has a similar rapid sixteenth-note run marked 'mp' and 'sim.'. The Violoncello part starts with a forte (f) dynamic and a crescendo marked 'p cresc. poco a poco'. The Double Bass part provides a solid rhythmic basis with a mezzo-piano (mp) dynamic.

Figure 3.5. Extract from: *Graveyard – The Call: Scene 1*; bb. 15-19, Transcribed by Peter Goosey, 2017, from *Journey Live score* (Wintory, 2015, p.10)

Whilst the violin and viola are both utilising the same harmonic orientation around D major, they function separately, using differing modes to create their own micro tonal worlds. The viola, arpeggiating in B minor, avoids the C#, whilst a similar technique is employed in the violin; excluding the F# from the A mixolydian mode. It is possible that Wintory is intending for the two instruments to be heard as a single amalgamated flurry of notes, centered around D major, however, did not want to apply superiority to either of the two parts, so as an alternative, used the relative minor (B) and fifth of the key (A) as points of initiation. Though performed independently, for brief instants the cells align and provide a fleeting hint at their relationship before diluting back into the sonic palette surrounding them. As the parts rhythmically disband and the texture as a whole converges, our attention is taken away from perceiving the score through individual lines but instead as a homogenous fusion between score and acousmatic sound, demonstrating properties common in sonic anaphones. Whilst this is happening, the player's solid rhythmic basis, which they may be

using as a sonic anchor to 'follow' the score, has been obscured by the aural particles. Blurring sounds of the gameworld and score through the discussed techniques promotes the merging of the denotative and critical systems of listening, due in part to player curiosity and the need to gather information about the game (Collins, 2008). In doing so, it is subtly promoting a change in the listening behaviors of the player and suggesting the "mutual implication" of the two sound sources for the remainder of the game (Gorbman, 1987, p.15).

The final moments of the cut scene conclude with protagonist's androgynous face and figure entering the shot, before relinquishing control to the player for the first time. The music provides very little insight into the origin of the game or the location in which it might be set; instead *Journey* floats around in a cultural no man's land, briefly hinting at ethnic and religious influences. When combined with the fact that there is no dialogue at any point, it suggests a desire to remove any content the player could feel detached from, increasing the possibility of positive empathic responses through the reduction of non-relatable idioms. In turn, this will increase one of the key attributes needed to develop immersion: curiosity (Federoff, 2002). Gradual and noticeable rises in pitch with increased dynamic intensity aid in connoting a sense of climax - this is a common technique used throughout *Journey* and presents a sense of arc within the music. By doing so the player is aware of the teleology of the scene and they remain orientated. For these reasons I believe the use of pitch, acting as the aural indicator in this section, in conjunction with the more obscure elements of the music discussed previously, prompt the player to transition from the first musical stage: musical establishment, to the second: musical induction.

The layered electronic pads during the end of the passage appear as semi-diegetic, typically included within the score, to be felt, rather than listened to; encouraging a less

intrusive reaction (Huiberts, 2010). The pad seems to comprise of sounds that draw sonic similarities to the acousmatic sounds and string sections, furthering blurring the lines between diegetic and non-diegetic sound in this scene whilst supporting the holistic nature of the sensory experience being created. It is worth noting that drones in the wind and brass sections of the score are providing a basis on which the sporadic non-synchronised phrases are placed. By doing so, it would appear as if the player is being conditioned to process the music as if it were inherently relatable to the gameplay, and by doing so, increases the amount of sonic material to be interpreted and the possibility of sensory immersion (or cognitive absorption) taking place. These sound layers appear to support the immersive attributes of the SCI model whilst, as Wintory explains, seek to wipe the player's emotional palette clean to orientate the player's emotions before being given control of the protagonist.

When relating back to the three main areas of focus, I believe to be integral to an immersive experience of this short scene. It is establishing the main theme and inferring its importance when relating to the gameworld and due to the intensity of the scene. The musical content, in this instance the main theme, is presented to the player and the aural environment (both diegetic and non-diegetic) established before providing the semiotic indicators that dictate the player's perception of the scene. Through the creation of a tension and release state through the use of rising pitches, ostinatos and instruments conflicting for the same sonic space, it results in the player anticipating the crescendo of the end of the scene (see *fig.3.6*).

The image shows a musical score extract for five instruments: Flute (Fl.), Oboe (Ob.), Clarinet (Cl.), Horn (Hn.), and Bassoon (Bsn.). The score is written in treble and bass clefs. The Flute, Oboe, and Clarinet parts feature a melodic line with dynamics *p*, *f*, and *p* leading to a *n* (no sound) section. The Horn part includes a section labeled "breath only, no pitch" with dynamics *mf* and *ffff*, followed by a "tongue stop" section. The Bassoon part features a melodic line with dynamics *f*, *p*, and *n*. Performance instructions include "hold back if needed..." and "Cut to Traveler's face." in a box.

Figure 3.6. Extract from: *Graveyard – The Call: Scene 1*; bb. 25-29, Transcribed by Peter Goosey, 2017, from *Journey Live score* (Wintory, 2015, p.12)

Though due to the short time the player has been involved with the game the player their emotions will not yet be effected. The short musemes work so effectively in this opening because of the tangible increasing in pace of the music, not necessarily in the rhythmic sense, but through the combination of textural intensity and dynamic surges, changing what the player can distinguish from the score and ultimately creating a panicked and overwhelming sensory feeling.

Due to the nature of this introduction, in that it is a cut scene that requires no physical input, the player's possible areas of attention will be reduced and so will be more consciously attentive to the aural and visual stimuli; for this reason the music has a higher chance of being foregrounded by the player. Initially, I divided this section into different listening modes, dedicated to identifying the role of each event change in the music, however, a possible weakness with this approach when applied to video-game music, is

each player's attention and susceptibility to music in general will differ. By analysing the music through a content based approach we can observe the music through established immersion theories, minimising the speculative guess work involved. By analysing the functions of the score through the five levels of the immersion model within the context of the scene, the resultant relationship between the on-screen visuals and the player can be more accurately analysed. The immersion framework (see *fig.3.7*) for the opening cut scene has been annotated, with the appropriate functions of each level highlighted.

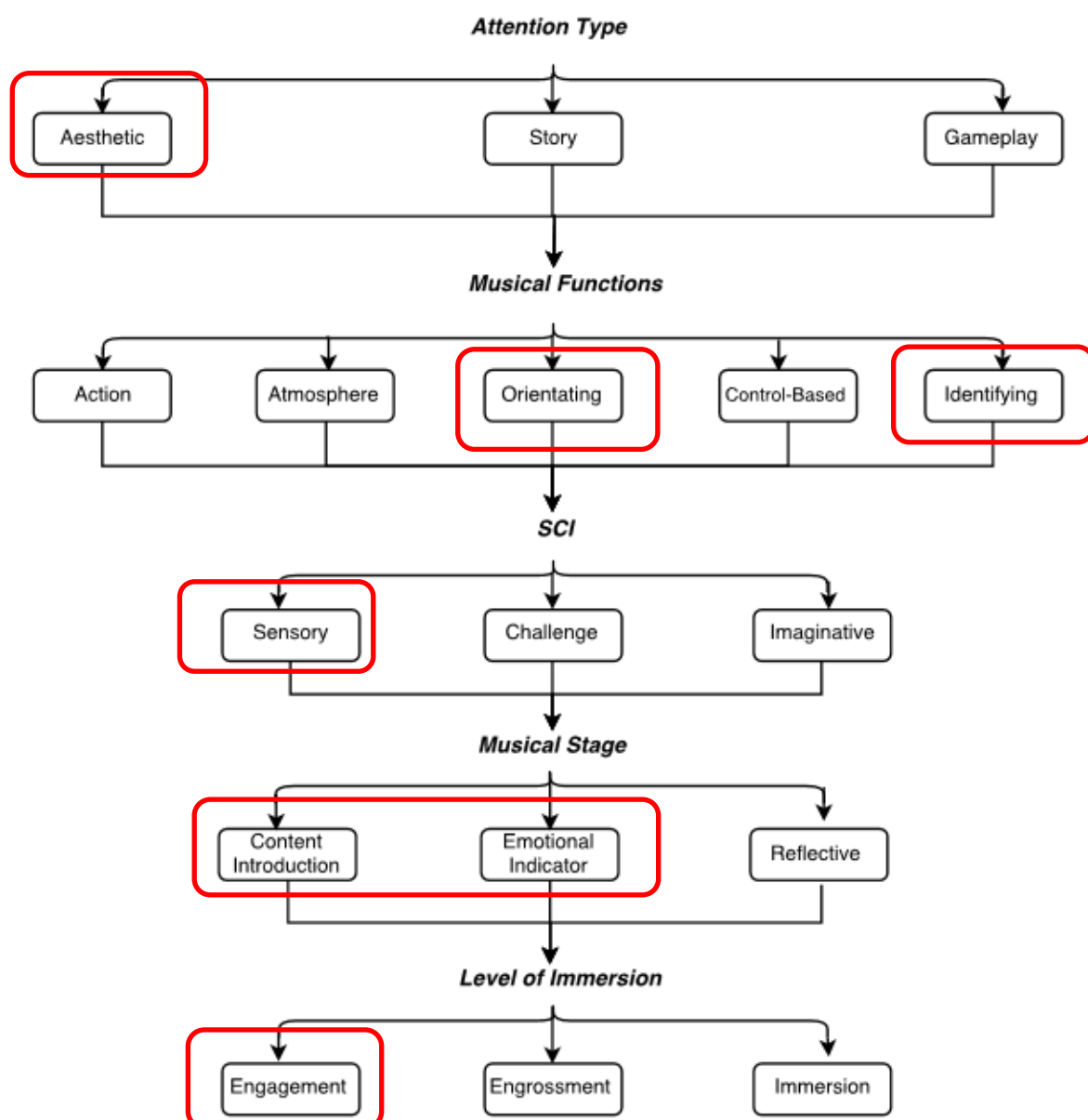


Figure 3.7. Theoretical Immersion Framework, annotated for *Graveyard – The Call: Scene 1*

Devoting the scene to the manipulation of the player's emotional state and attempting an 'emotional detox' offers the best possibility for the musical signs and indicators to be decoded in the intended manner, as they are beginning as a 'blank canvas' (Wintory, 2013). *Journey* is utilising a variety of stimuli on the player by combining a number of compositional and immersion techniques, presenting large amounts of rapidly changing material in the soundtrack and on screen in an attempt to overwhelm the player's auditory and visual senses by exploiting their "reflexive attention" (Lemarchand, 2012, p.39). However, due to the volume of information the player is trying to absorb, an "attention bottleneck" (Lemarchand, 2012, p.25) could be created, possibly overwhelming the player and leaving them at the mercy of the scene. However, by leaving the player in a state of sensory overload at the end of the scene it accentuates the 'virtual silence' generating curiosity, allowing the player to be drawn into the narrative whilst increasing their susceptibility to the primary emotions of the game world (Federoff, 200; Schafer, 1977). Lemarchand states that the story or narrative is the second aspect of the game that the player will turn their attention to after being allured by the aesthetics of the game (Lemarchand, 2012). At this stage, the story is just as successful at achieving the player's attention as it is holding it, until the player transfers their attention to the gameplay. Movement between these areas of attention will be integral to the player maintaining a healthy level of attention, and with it immersion, as the possibility of "vigilance fatigue" will be diminished (Lemarchand, 2012, p.31).

3.1.2. Scene 2: *Canyon – The Road of Trials*

The *Canyon* section of, *Journey*, sees the player travelling through a series of ruins, some obscured by the sand whilst others still tower, it is clear that an impressive civilisation used to cover the dessert floor, however, only empty structures remain. The score has been written adaptively to the scene with stingers and motifs created to be repeated in order to sync with the players physical triggering of the subsequent events. During this section, which I have divided into three sections, we have one of the most immersive moments of the game, due in part, to the abrupt changes in control and aesthetic dominance of the game.

The player's initial focus is on the gameplay at the start of the scene, prompting the music to be perceived as mid-grounded and, though it will be heard, the player will be encouraged to focus on the actions of the character, not the music. As a result, the player's attention to the music is secondary to the control-based aspects of the gameplay, promoting the score to be heard in a connotative system of listening, opposed to it being 'listened to' actively (Huron, 2002). One of the main supporting factors for this is the introduction of rhythmic elements for the first time in the score (see *fig.3.8*), that "infer various physical properties and passively learned associations", heightening the effectiveness and impact of the music (Tuuri, 2007, p.15).



Figure 3.8. Extract from: *Canyon: The Road of Trials*; bb. 57-62, Transcribed by Peter Goosey, 2017, from *Journey Live score* (Wintory, 2015, p.100)

The pronounced rhythmic aspects accentuating beat one amalgamate with other elements of the composition, such as melodic accents from the constant quaver note passage in the harp and the heavy use of staccato in the cello and piano to amass into an action-orientated scene. Classifying them as promoting a combination of both sensory and challenge based immersion. Lemarchand describes gameplay as the most powerful function of a video-game for holding the attention of a player (see *fig.3.3*), however, at this point in time must be developed by establishing appealing aesthetic and narrative components. The music stage at this point in *Journey* can be considered as reflective and so would require the player to be in at least the engrossment stage of immersion. However, as a physical and emotional response is being prompted and a strong focus on the control-based aspects of the game is present, I believe that the player will experience total immersion.

The percussion acts as an auditory signal included within the score to promote a response signal, indicating that action is required from the player. It is one of the few events in *Journey* that is of a predetermined length, simply requiring the player to direct themselves down the dunes. Atmospheric sound and music, after a brief period of silence, are used to emphasise an air of playfulness to the mood, while also letting the player know that immediate control is required during this scene. The function of the music here is firmly control-related and further preserves the challenge-based immersion the player is going to be experiencing through the use semiotic devices. Wintory remarks on this section of the game and recollects the directions expressed by Chen, commenting:

Even though the energy in this track is meant to match the visceral fun of the sand-surfing, Jenova Chen always wanted to be sure we never lost a slight tinge of sadness. The canyon is made of ruined buildings, so a subtle poignancy must never be lost, even in the excitement. (Wintory, 2013, 18:13)

To accent an adaptive change in the music, the player is presented an episodic marker in the form of a short passage played by the harp (see *fig.3.9*), indicated on the score not to be played in a strict tempo (Tagg, 1992).

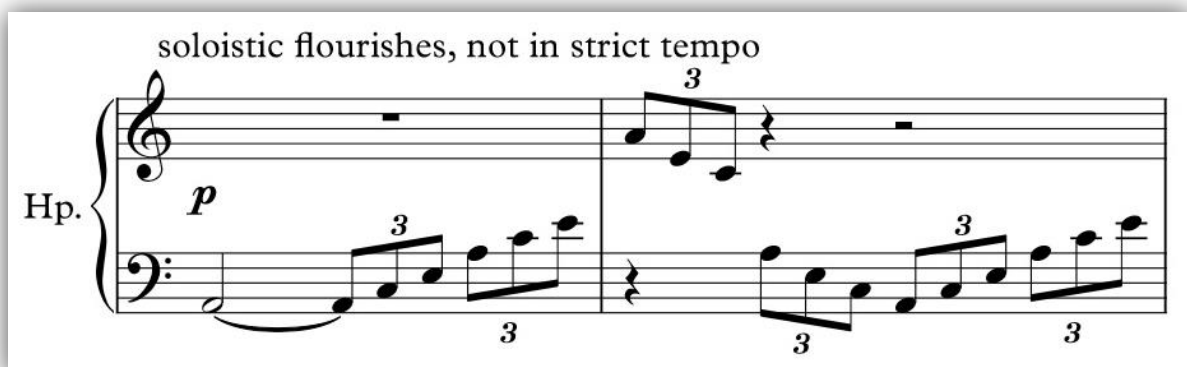


Figure 3.9. Extract from: *Canyon: The Road of Trials*; bb. 66-67, Transcribed by Peter Goosey, 2017, from *Journey Live score* (Wintory, 2015, p.101)

The harp is used as a device to break down the tempo and rhythmic structure that were the foundation of the functions supporting the immersive state. By deconstructing the rhythmic flow of the previous section, we have a direct and obvious move away from the challenge-related functionalities the game was providing aurally, whilst sustaining any atmospheric functions (Lemarchand, 2012). During this transition period, the score will revert back to the content introduction section of the musical stage before any familiar content can be recognised by the player again. Leading on from the harp, the beginning of the second section of the *Canyon* scene is cued by the player's movement into the ruins.



Figure 3.10. Journey screenshot. (Forbes, 2012)

The camera angle is panned from directly behind the character to 90 degrees to their left, backgrounding the mountain directly behind the protagonist (see *fig.3.10*). The previous instrumentation fades, creating space for the cello and viola to swell into the fore-ground, playing the main musical theme in perfect fifths (see *fig.3.11*).

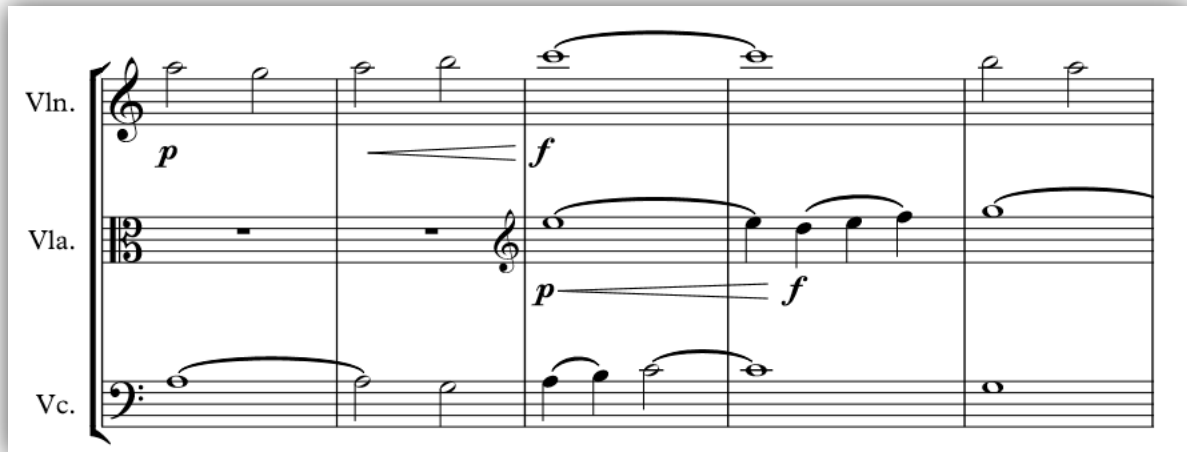


Figure 3.11. Extract from: *Canyon: The Road of Trials*; bb. 78-82, Transcribed by Peter Goosey, 2017, from *Journey Live score* (Wintory, 2015, p.104)

Both instruments begin and finish the theme within 4 bars, however, each perform freely and find their way through the line independently with rhythmic meanderings, before cueing the introduction of the viola which continues the theme in a similar rhythmic vein (see *fig.3.9*). The result is a prolation canon; with each line containing differing rhythmic material, though, the accompanying lines are not perfect rhythmic divisions of the original theme and fluctuate between augmentation and diminution. When comparing the forte markings of the violin, viola and cello to the pianissimo instructions given to the harmonic accompaniment it clearly indicates Wintory's desire to have the theme placed perceptibly at the forefront of the score. The distribution of orchestration across the frequency spectrum creates a balanced sound world, though by placing the musical theme an octave above that of the opening iteration, it allows the melody of the score to be carried through the detailing that the upper/high frequencies provide (Kutay, 2006). By doing so, *Journey* is demonstrating several attention and immersion sustaining techniques, supported by regular changes in the semiotic and musical functions of the soundtrack. As a result, the power of which the mountain is alluded to makes it difficult not to firmly associate *Journey's* main theme with the mountain, establishing it as a fully denoted earcon and engaging with the

player's reflexive attention (Jørgensen, 2006). The theme could easily have been obscured within a myriad of sounds and textures, only to be discernible to the keenest of ears, essentially included it as nothing more than an aural 'Easter egg', though, its prominent and deliberate fore-grounding enhances the belief that the score is directing and supplementing the games narrative and the player's experience on a much more informed level.

Lemarchand's attention theory states that a person will only be able to maintain their attention purely on the aesthetics of the stimulus for short period of time, typically around 30 seconds (Lemarchand, 2013). Although the player has the ability to loiter between adaptive sections, if we were to apply the same principle to this moment in *Journey*, it would be ideally suited to maintain aesthetic attention, generally last in the region of 30 to 35 seconds. When we take other immersive aspects into consideration during this section they surely going to maintain the attention needed in order for full immersion to be achieved. The score has relied on itself to identify and imply an objects value; Wintory has utilized this in *Journey*, not only in the form of earcons, but also as auditory icons that are automatically recognisable. The theme also works as what Pierce (1998) would describe as an indexical sign, as the events of the theme and image of the mountain are being presented simultaneously. It is clear that the attention the player is experiencing through the game design and the resultant feeling of immersion has been paired with appropriate semantic functions to create a strong bond of elements leading to the same immersive outcome. By associating the main theme with the mountain so obviously it promotes an adequate response (player decodes the music in the intended way) from the player through reducing the possibility of codal incompetence (a breakdown in understanding between music and player), the static camera view at this point forces the mountain to be in view and minimise any codal interference (Tagg, 2013). Referring back to

Chen's emotional intensity chart (see *fig.3.1*), the *Canyon-The Road of Trials* is the most emotionally intense part of *Journey* up to this point and the third most intense section overall, supporting the notion that this could be the first adequate response from the player to the mountain through the earcon provided in the very first scene. What was once just a tool for dynamisation and an emotional indicator for the player, has transformed and evolved into optimisation for the score and as a result, can now be classed as reflective music. During this moment, minimum control is required supporting the music's transition to atmospheric, furthermore, the increased emotionally suggestive material creates a greater possibility of mood induction through the music (Federoff, 2002). By fluctuating between types of immersion and attention, *Journey* is changing the player's type of immersion at this point into imaginative immersion by pairing primary and secondary emotions, as well as reinforcing the narrative with the inclusion of the main theme (Ermi and Mäyrä, 2005; Sonnenschein, 2001). During the transition we have changes in several immersive aspects that the scene is supporting, though immersion is not broken or interrupted at this point. By looking at the immersion chart, we can highlight the resultant functions of the music (see *fig.3.12*).

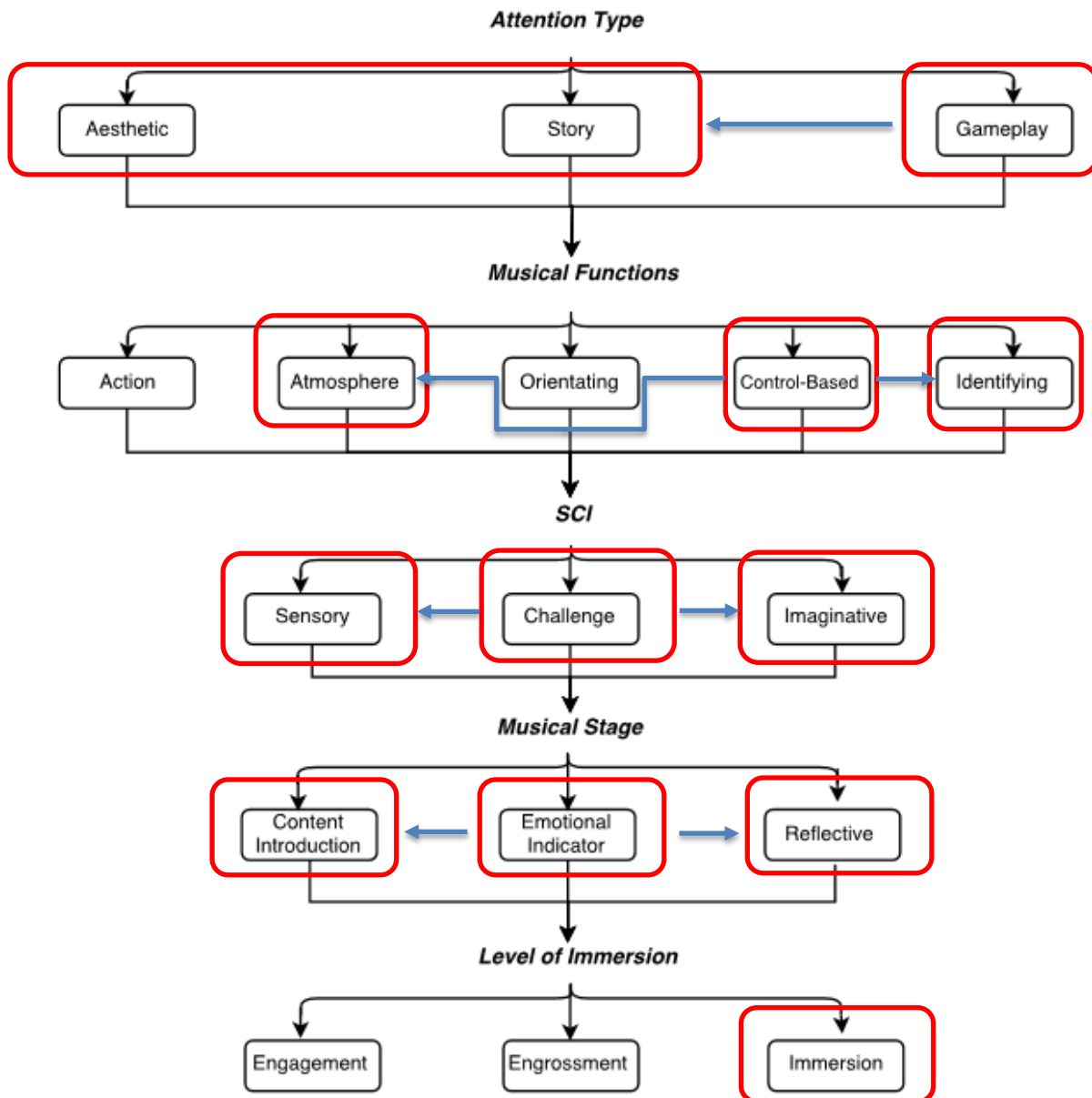


Figure 3.12. Theoretical Immersion Framework, annotated for *Canyon: The Road of Trials*

The control-based functions of the music that were carried in the music have now changed to atmospheric and identifying functions to support the change in the attention type the game is encouraging from the player. As a result of this, the type of immersion the player is likely to experience at this point is imaginative and sensory due to the strong narrative support.

At the end of the tunnel-like structure the score provides another adaptive change in the score whilst preparing the mid-grounding of the music. The instruction of ‘soloistic flourishes, not in strict tempo’ is again given to the harp whilst playing a Gmaj⁷ arpeggio, over a sustained Cmaj⁶ harmony created through the strings and winds (see *fig.3.13*).

The image shows a musical score extract for measures 93-96 of *Canyon: Road of Trials*. The score is arranged for Harp (Hp.), Piano (Pno.), Violin (Vln.), Viola (Vla.), Violoncello (Vc.), and Double Bass (Db.). The Harp part is marked 'Soloistic flourishes, not in strict tempo' and 'mp'. It features a G major 7th arpeggio. The Piano part is mostly silent. The String section (Vln., Vla., Vc., Db.) provides a sustained C major 6th harmony. The dynamics transition from mp to ppp at the end of the section.

Figure 3.13. Extract from: *Canyon: Road of Trials*; bb. 93-96, Transcribed by Peter Goosey, 2017, from *Journey Live* score (Wintory, 2015, p.107)

The brief use of the Gmaj⁷ and Cmaj⁹ provides all the notes within a C major scale, excluding the A; this is perhaps to prevent the tonality being misinterpreted as A minor by the player. Wintory has established the player’s susceptibility to the music at this point, though wants to avoid any codal incompetence that could arise. However, with the addition of the harp the key shifts from C to G major, initiating a subtle harmonic movement between scenes as well as preparing for the upcoming transition from G major to A Dorian. The transition to A

Dorian is marked by a sudden reduction of rhythmic material and by doing so, prompts the player to revert back to a sensory style of immersion. Similarities can be drawn between this and first of the *Canyon* sections, in which the score contained less emotionally suggestive writing and employed the use of rhythmic and percussive elements, with a 'driving' tempo. It is clear that during these two adaptive cross-over sections that the music is moving systematically between optimisation and dynamisation states (see *fig.3.14*).

Scene	Optimisation	Dynamisation	Overview
Sand Surfing 1		X	Music provides rhythmic accompaniment for the on-screen actions, creating a more thrilling experience.
Tunnel	X		Earcons are given to the player during the view of the mountain help support the narrative of the game.
Sand Surfing 2	X	X	Music provides rhythmic accompaniment for the on-screen actions and offers kinetic anaphones to increasing the experiential quality of the scene.
Nose Dive and Leap		X	Music acts as an emotional indicator and as an indicator of upcoming events and prepares player for the next scene.

Figure 3.14. Table of Optimisation and Dynamisation for *Journey*

The staccato playing of the cello and viola lines, accompanied with every 4th and 5th triplet accentuated within the melody, enforces the feeling of a prominent rhythmic pulse for the scene, illustrating the atmospheric and action-related functions exhibited in the music from the beginning of the scene. After establishing and familiarising the pulse for the player, the cello is given a flowing legato passage while scarfs begin to fly around the protagonist (see *fig.3.15*).



Figure 3.15. Extract from: *Canyon: The Road of Trials*; bb. 97-101, Transcribed by Peter Goosey, 2017, from *Journey Live score* (Wintory, 2015, p.108)

I believe this to be a deliberate technique by Wintory to transition the role of the cello in the score and develop it as a kinetic anaphone, anthropomorphising the flying the scarfs. Cohen (2000) suggests that objects are perceived as alive and exhibiting anthropomorphic behavior when their motions are accompanied by a synchronized soundtrack. Whilst the music may not be strictly synchronised to the movement of the scarfs it aids the believability of the scene as a whole by supporting the illusion that their movements are informed and intelligent (Tence, Buche, De Loo, & Marc, 2010). In this moment, the game design and soundtrack are operating harmoniously, enriching the others material to promote the induction of presence, through the pairing sensory and imaginative immersion (Huiberts, 2010). As expected when promoting challenge-based immersion through action related functions, the score does provide a discernible pulse through the $\frac{4}{4}$ metre. Though Wintory has chosen to employ subtle rhythmic accents around the expected beat, that to the attentive player will unbalance the playfully stability of the piece and suggest the underlying upcoming danger. The first indicator is the relatively constant emphasis of the beat by the piano and harp, supported by the introduction of the horns, winds and double bass at the first beat of the second, fifth and eighth bars. However, moving against this is the cello (see *fig.3.15*) playing the melody line; a short 12 note triplet ostinato that an unfamiliar player

could perceive as a larger flowing line, although is actually a single repeated motif in $\frac{5}{4}$. The cello repeats this cell three times, with the first cell starting on the first beat of the first bar and the last iteration beginning on the third beat of the third bar, the melodic cells are then introduced once again in the ninth bar, an octave above. In support of the polyrhythms in the cello, Wintory has also used the percussion (low tom and bass drum) in the same vein, however, opting to employ the Reichian phasing method to constantly shift the pulse of the piece by a semi-quaver each bar, in order to create a seemingly disorientating rhythm for the player to interpret, which in turn will increase the polyrhythmic intensity between instrumental sections (see *fig.3.16*).

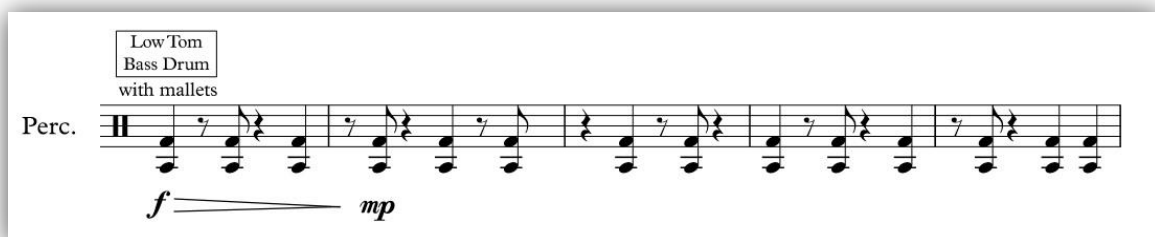


Figure 3.16. Extract from: *Canyon: The Road of Trials*; bb. 97-101, Transcribed by Peter Goosey, 2017, from *Journey Live score* (Wintory, 2015, p.107)

By extracting and isolating the notes that are providing harmonic structure to the piece and by excluding any melodic lines, it becomes clear that Wintory is trying to provide harmonic movement whilst maintaining as many corresponding notes as possible between chords. However, the omission of any sharps or flats whilst within the tonal variations suggests the implementation of modal harmony. The first chords of the section keep the emphasis on the A within each chord, creating tonal ambiguity, though maintain the possibility that the progression is based around A Dorian, utilising the minor 3rd and 7th (see *fig. 3.17*).

The image shows a musical score extract for measures 97-101 of *Canyon: Road of Trials*. The score is arranged in a system with seven staves: Horn (Hn.), Bassoon (Bsn.), Percussion (Perc.), Violin (Vln.), Viola (Vla.), Cello (Vc.), and Double Bass (Db.). The Percussion part includes a box labeled 'Sus. cymbal with sticks'. Dynamics include *fp*, *f*, *p*, *ff*, and *fff*. The string section (Vln., Vla., Vc., Db.) is marked 'With Power' and *ff* at the beginning, and *fp* and *fff* later. The Horn and Bassoon parts have dynamics *fp* and *f*. The Double Bass part has a dynamic *p* at the beginning and *ff* later.

Figure 3.17. Extract from: *Canyon: Road of Trials*; bb. 97-101, Transcribed by Peter Goosey, 2017, Journey Live score (Wintory, 2015, p.112)

By making sections of the harmonic progression modal it allows for several interpretations of the music that the player is hearing in the game without forcing the score into a definite key. In addition, the note selection allows for each chord to be created by rearranging the existing notes with the addition of (usually) a single new note, disguising the feeling of movement away from a familiar tonal center. However, a clearly inescapable minor harmony is provided and reaffirms that a change in the communication of emotional meaning is occurring. The finale of the ruin section exploits the most intense dynamic movement, with a fortissimo indication in the score for the first time. Sustained strings and winds provide an underlying texture on which the drums, strings (cello, violin and viola) and

horn (playing a minor 2nd interval) are placed, acting act as an indicator of upcoming events (Lissa, 1965). Although the score has moved through various chords, it has only alluded to harmonies and has used ambiguity as a means of balancing the emotions of the scene. By referring to the framework we can see that the final scene is exhibiting orientating functions and acts to inform the player about the presence and relative location of objects and events, enabling the player to predict what action might be about to take place outside the immediate vicinity of the protagonist. For example, it is clear that the minor 2nd interval is presenting a safety/danger state to the player and acts as an indicator of upcoming events for the underground passageway the player is about to find themselves in, however, at that point in time the player is not visually aware of the impending danger (Lissa, 1965). Though when the protagonist drops underground, suddenly the music falls silent. This is creating what Schafer refers to as a “virtual silence” (Schafer, 1977, p. 259) and can be incorporated to accentuate a quiet stage in games. Furthermore, the use of silence can also improve focus and concentration as a sudden silence can make our hearing extremely alert (Schafer, 1977). The crescendo experienced is reminiscent of the opening scenes by offering a large amount of auditory information to the player, encouraging sensory immersion, before cutting to a ‘virtual silence’, emphasising the tension and directing the player’s attention away from the music and to the visuals of the scene, serving as an episodic marker and signifying the end of the scene (Huiberts, 2010; Schafer, 1977; Tagg, 1992).

3.2. Conclusion

In the brief passages that has been dissected and explored within *Journey*, it is clear to see that several changes in types of immersion, promoted through changes in the

functions of the music in conjunction with the game design, have taken place. The ability to provide information from the game world whilst still maintaining an inviting and enveloping aesthetic for the player demonstrates the successful utilisation of the two key objectives that the IEZA model identifies within game audio: dynamisation and optimisation. The conscious transitioning between the two objectives creates an intelligently show that the score is working on levels of varying significance, all are in support of one another. Changes between rhythmic and melodic content provides a varied score for the player to remain engaged with over a long period of time. Continuous immersion is supported by handling the player's attention with care; transitions between scenes do not interrupt the flow of play, due to them preparing the player and providing them with the aural signposting needed to anticipate changes in the score, causing them to happen at seemingly natural points. By providing material intended to engage with the player, both consciously and unconsciously, it divides their attention between the game design and score. Each aspect does not vie for attention, but instead choose their moment to be focused on, in order to mutually complement one another and sustain immersion. In addition, the player is presented with clear changes in the musical stages and semiotic compositional techniques, leading to constant transitions in immersive states. Due to the length of *Journey* and the fact that it can (and is intended to) be played through in a single sitting lasting around 90-120 minutes, highlights the importance of sustaining the attention of the player from scene to scene. By designing changes in immersive and attention types, the interest of the player is cultivated and allows for them to maintain an enhanced level of susceptibility to the functions of the music by avoiding becoming fatigued in a single state, in turn creating an increasingly enveloping immersive environment for the player.

Chapter 4

Self-Analysis of a Model-Based Method of Composition to

Promote Immersion in Video-Game Soundtracks

4.1. Video-Game Selection for an Immersive Soundtrack

In this chapter I will be reflecting on the compositional part of this thesis. This is informed by the theoretical immersion framework and analysis on *Journey* (2012), presented in chapters 2 & 3. To evaluate and field test the framework and key immersion theories, I have composed an original 20 minute soundtrack for the 2010 independent indie game, *Limbo* (2010), by Playdead. All visual footage for the accompanying video was taken from the public Pro Level Gaming (2013) YouTube channel and belongs to PLG. I do not claim to own or intend to distribute any of the visual content. The original composition I have written in accordance with the immersion framework is attached with this thesis, however, the video may also be viewed on YouTube at: <https://www.youtube.com/watch?v=bJINsTaD4Q8>.

I chose to compose to, *Limbo*, because of the similarities it shares with, *Journey*, notably in the presentation of an ambiguous narrative, which allows for the music to act as an additional method of communication about the story throughout, by way of aural typology. Much of this ambiguity, like *Journey*, comes through the emphasis of the art design and unwillingness for it to be undermined with the inclusion of strong narration, verbal dialogue or written interactions. *Limbo's* aesthetic has been described as an amalgamation of film noir and German Expressionism, opting to allow the story to be

presented, not told to the player, through the incorporation of self-explanatory, well-defined environmental designs that avoid unnecessary textural elaboration (Ligman, 2010). The length of the game is also similar to *Journey* in that it can be played through in a single sitting, lasting only a few hours in total and is described as having a “perfectly formed running time” (Hoggins, 2010, para. 6). This is an important similarity between the two games as it changes the way in which the music functions and is received by the player over the shorter period of potentially uninterrupted time. At the time of its release, *Limbo* received a number of awards reflecting its success, these included: Game of the Year, Best Indie Game and Best Visual Art at 2010 The Milthon Awards; as well as, Technical Excellence and Excellence in Visual Art awards at the 2010 Game Developers Conference (Milthon Games Awards 2010: European Winners unveiled, 2010; Hatfield, 2010). Due to its reception, *Limbo* went on to sell 244,000 units in the first two weeks of its release on the Xbox Live Marketplace (Grubb, 2012).

This chapter presents a personal account of the methods and compositional decisions made, based on my research, and the resultant issues that arose by analysing and reflecting on some of the most influential moments within the soundtrack. The areas I will be reflecting on are: the technical constraints and techniques used; and the compositional considerations made in relation to game audio theory and the supporting immersion theories, presented in the previous chapters.

4.2. Guiding Composition through Technical Constraints

4.2.1. Adaptive Audio

Opting to write in a seemingly through composed manner was a method that created technical issues that I had to be aware of whilst scoring. In order to create an authentically written video-game soundtrack, opposed to a 'to-screen' score for a film, I wanted to try and create a score that had the possibility to adapt with the player's actions. Initially, my intention was to compose and realise the music in Ableton Live 9 then import each track into Elias, a purpose built adaptive audio software program. Elias would be used to create the crossover points for each individual piece in the soundtrack by manually triggering the introduction of each new track whilst I watched the footage in real time. Before this research, I had no prior experience with Elias, and as a result, it forced fundamental changes to my instinctive compositional process, forcing me to tackle some of the issues surrounding adaptive music creation.

I created the score in Ableton, composing one instrument at time and bounced each part to the same length to ensure the correct playback positions were maintained. I then imported each individual track into Elias to create stems, repeating the process for each section of music and essentially building the several individual pieces of the soundtrack one instrument at a time. This, in theory would have allowed movement between stems by gradually transitioning to each new instrument in the next track, as required. However, this caused several problems with the playback of the music due to how Elias is designed to only allow random changes in the instrumentation. The only option is to choose how many instruments begin the section, but no option is provided to allow specific instruments to be selected and changed throughout. Though, after attempting to vary the number of voicings, it was clear that this too was not a feasible or reliable method as key instruments were

being silenced in favour of stems causing abrupt changes during the transitions between pieces. Arranging the music Elias was intended to provide as an authentic compositional process as possible when approaching the soundtrack, however, over time was proving to be too compositionally constraining and to continue with the process would have constricted my compositional freedom and compromised the ability of the soundtrack to promote immersion.

When creating a soundtrack that attempts to promote immersion, there will be several main points of consideration throughout the writing process. The main focus and most compositionally influencing factor, for me, was the conscious effort to create music that supported the gameplay appropriately and with it, the changes in the player's focus on particular aspects of the game design. I wanted the music to support what the player was focusing on (i.e. controls, visuals or narrative) and to foreground, mid-ground or background it accordingly by using appropriate textures, instrumentation and content. To aid the impression that the music was responding to the gameplay, I did not want the soundtrack to be interpreted as individual tracks with clear breaks between pieces but instead as an additional narrative for the game that transitioned seamlessly between each track, evolving organically. Writing in this manner meant that the individual pieces must have the ability to be merged from one another when triggered by the player's movement through a specific section of the gameworld. In addition, it was important to consider that the pieces must also be able to either repeat or continue long enough for the player to reach the end of the section. However, attempting to achieve compositional fluidity created some difficult technical constraints, relating to the many possible actions of the player and how the music must be created with these scenarios in mind. Deciding what compositional approach to

employ when supporting a scene in which several options are viable, whilst avoiding extended periods of time in a particular style of listening, was a delicate task.

4.3. Self-Analysis of Music

My decision to create fluid transitions between pieces was supported by the work of Lemarchand (2012), in which he states that a player can typically only focus their attention on something for a few minutes before the effects of attention fatigue take place (Lemarchand, 2012). Therefore, I made a considered effort to not only keep the length of the material relatively concise, but to also to ensure the support of aural optimisation and dynamisation to fluctuate between the music's support of the controls, aesthetics and game design to create a diverse experience.

The soundtrack is separated into 10 individual pieces, averaging 2 minutes per track. The chart (see *fig.4.1*) shows the utilisation of dynamisation and optimisation in the music, displayed in the same manner as in the analysis of *Journey*.

Scene	Optimisation	Dynamisation	Overview
Intro		X	Soundscape offers large amount of sensory stimulation. Acts as an atmospheric function.
Water		X	Music continuing to provide atmospheric functions.
Trees in the Forest	X	X	Music adds content to the narrative of the game that communicates to the player about the gameworld, as well as improving the game experience.
Spider	X	X	Indicator of upcoming events associated with the narrative of the game. Identifying functions are offered to the player through kinetic anaphones. Dynamisation provided through rhythmic elements of the score.
Cocoon	X	X	Extended techniques blur the line between diegetic and non-diegetic sounds. Provides indicators of upcoming events, anaphones and earcons for the player.
Logs		X	Music adds atmospheric and action-related functions.
Tribe and The Spider's Fall		X	Focus on rhythmic elements in the score. Score exhibits action-related functions.
Return of the Spider	X	X	Blurs the line between diegetic and non-diegetic sound but provides emotional indicators.
Inside the camp		X	Focus on rhythmic elements in the score and atmospheric functions
Machines		X	Music returns to a Sensory style of immersion, timbrally focused on atmospheric functions

Figure 4.1. Table of Optimisation and Dynamisation within scenes in *Limbo*

The chart illustrates how the music mimics Wintory's compositional techniques in *Journey*, by reproducing and supporting the focus on its alternating content in relation to the on-

screen actions, to maintain immersion. This is achieved by acquiring and maintaining the player's attention by changing what aspect of the game design the music is communicating to the player.

4.3.1. Soundtrack Aesthetic and Immersion Through Narratives

Whilst writing the soundtrack my main consideration was for the music to be extremely considered and created in accordance, where possible, with the immersion model I had created, as well as showing a clear and measured relationship between the audio and visuals. The aesthetic design of *Limbo*, as discussed previously, made me resist promoting too much optimisation through the soundtrack as it would have contrasted with the ambiguity of the design and narrative style. It is also worth stating that I have scored *Limbo* from the beginning of the game as it was the most logical point to begin writing from as the player will be less familiar with the games sound world and ideas can be developed from scratch without assuming any prior understand. Due to this, I thought it was important to increase dynamisation through the score in the first few scenes, in order to maintain the player's attention. When first mapping out my score, I wanted an overarching linear change in the timbral environment throughout the piece, beginning with a textured soundscape from which delicate melodic colourings could develop and emerge organically. The change in the sound world was intended to accompany the developments of the narrative on the screen as the protagonist, only known as 'a boy', makes his way through a monochrome world that grows increasingly sinister (see *fig.4.2*).



Figure 4.2. 'A boy' (The Game Critique, n.d.).

Deciding to use less melodic moments within the score was an attempt to focus the player's attention towards the timbre of the sounds, through a critical system of listening (Huron, 2002). Originally I intended to incorporate a slow and gradual transition from a densely textured environment into a traditionally arranged melody based score in a linear manner throughout the soundtrack, to reflect the changes in the protagonist's narrative (primary emotions), as well as the empathy the player has for the story (secondary emotions). My intention was that this would allow for moments of striking beauty and sadness in the game to be encapsulated by a dense mirage of sounds. Due to the art design of *Limbo*, I felt that a timbrally focused score would pair well with the aesthetics and accentuate the underlying style of narration, hopefully "diminishing critical distance to what is shown and increasing emotional involvement to what is happening" (Grau, 2003, p.13)". However, when sketching this initial idea, I decided that the music would need to slowly transition and develop from a heavily textured palette of sounds into a more melody focused score, benefiting from identifiable tropes and a clear typology. Marking a distinctive

shift in the sonic and musical language of the music, in addition to the way in which the music would have to be interpreted by the player.

4.3.2. Realisation of Timbral Environments

The electronically manipulated sounds of the opening and particulate sonic qualities of the score were inspired by Robert Henke's piece, *Dust* (n.d.). The full exploitation of stereo field was also inspired by Henke's use of speaker systems during live performances to create a hierarchical environment of sounds, each with its own sense of life and movement that can be focused on separately or as part of the collective mass. For several of the percussive instruments I used the modulation plugin: PanCake 2 (see *fig.4.3*) to create subtly but rapid movement between each extreme of the stereo field to create a physical sense of movement and organic life.



Figure 4.3. PanCake 2 settings for Bamboo Chimes

The instruments affected during the opening section are a combination of percussive elements (metal chimes, bamboo chimes, bowed crotals, bowed cymbals, ocean drum, rainmaker, spring drum), pads and synths (Flying Monkey synth, Evolve pad) and a prepared piano. Producing a sonic result that exists texturally, not demanding to be heard critically though still enables genre synecdoche (Huron, 2002; Tagg, 2013).

Whilst trying to maintain compositional detachment from a melodic focused style of writing at the beginning of the score, it made it easier to prompt and denote moods from the music for the player to project onto the protagonist, in an attempt to promote primary and secondary emotions (Sonnenschein, 2001). However, this increased the prominence of the inclusion of melodic fragments and with it the delicacy that they must be treated with. Even the inclusion of any similar material for characters or scenarios in the game had to be done more through combinations of instruments and sounds within the already busy texture. I had a series of effects placed into the master track of the score, through which all of the tracks playing could be manipulated. I routed the effects in the following order: resonator, frequency shifter, filter delay, reverb, compressor and a limiter (see *fig.4.4*).

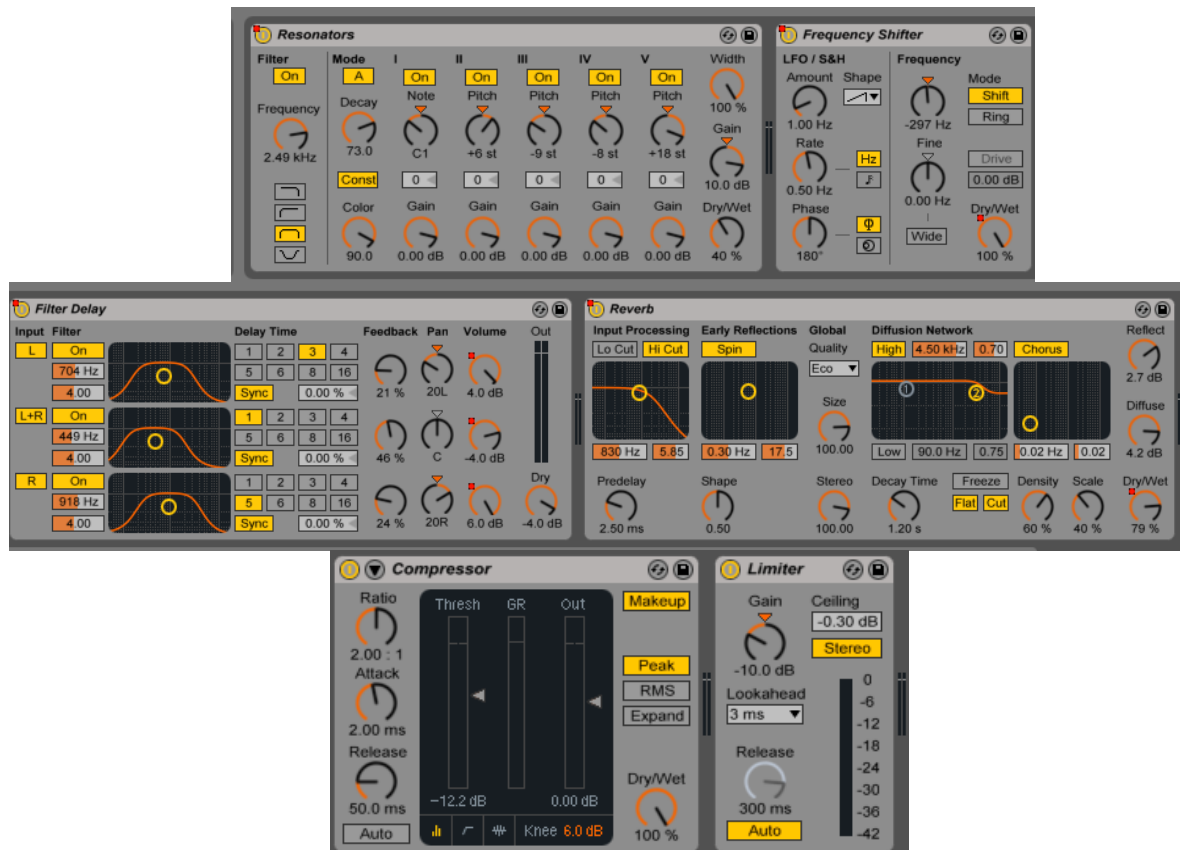


Figure 4.4. Master rack effects in Ableton Live.

Online tutorials published within the blog section of ableton.com (Make Lush Drones in Live with Synths, Samples, and Effects, n.d.) proved to be particularly useful when learning about effects racks and routing options for the effects process as the plugins demonstrated were already available in Live 9. Although the instruments in this section were already routed through a series of effects, the Flying Monkey Synth was also utilizing a large number of more additional plugins, as I had a distinct textural idea of what I wanted from it. To achieve this I used: Corpus, MonstaChorus, Pancake 2, EQ, and Crack (see *fig.4.5*).



Figure 4.5. Flying Monkey Synth rack effects in Ableton Live.

The sonic result was a lo-fi, harmonically rich swirl of multi-layered sounds, with a bright and well detailed characteristic. Due to the wash of the sounds the beginning of the soundtrack provides, instruments such as the rainmaker can easily be mistaken for acousmatic sounds and so have the ability to distort the player's perceptual barrier between the 'in-game' sounds and accompanying music.

My decision to obscure or occlude leitmotifs through a veil of effects was a deliberate effort to keep the focus away from any specific explanation of the narrative. The soundtrack adds to the environment and becomes an additional layer for the aesthetic design of the game, promoting sensory involvement, whilst mid/backgrounding the music. A large amount of the melodic content heard later is included in sound worlds that the player will have already encountered, though will have been occluded by other instruments and altered sonically with a number plugin effects. For example: the subtle introduction of the clarinet emerging from the textural opening of the score, at 0:57 in the video. For this, I

used a TAL Reverb II plugin (see *fig.4.6*) to control the perceived sense of distance the clarinet it has from the timbral-based material it is following.

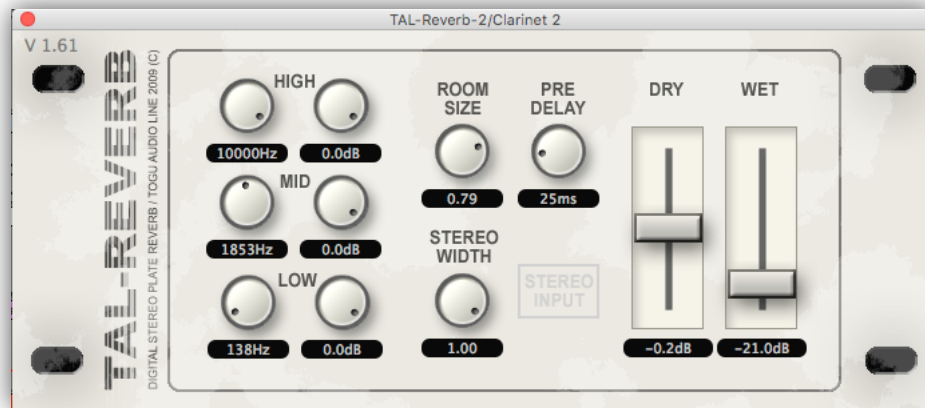


Figure 4.6. TAL Reverb II settings for 'Clarinet 2'

By targeting existing harmonics, predominantly caused by the resonator and prepared piano, I used the clarinet's timbral qualities to try and incorporate subtle developments in the score without causing an abruptly noticeable change in the direction of the harmony. This motif is subtly repeated later in the game, however, the instrument and tonality of the line will have been changed to reduce its immediate impact to the player. Due to it being very early in the game, I wanted to be careful when including the first instance of melodic material to avoid an abrupt introduction for the clarinet, possibly disrupting the induction of immersion.

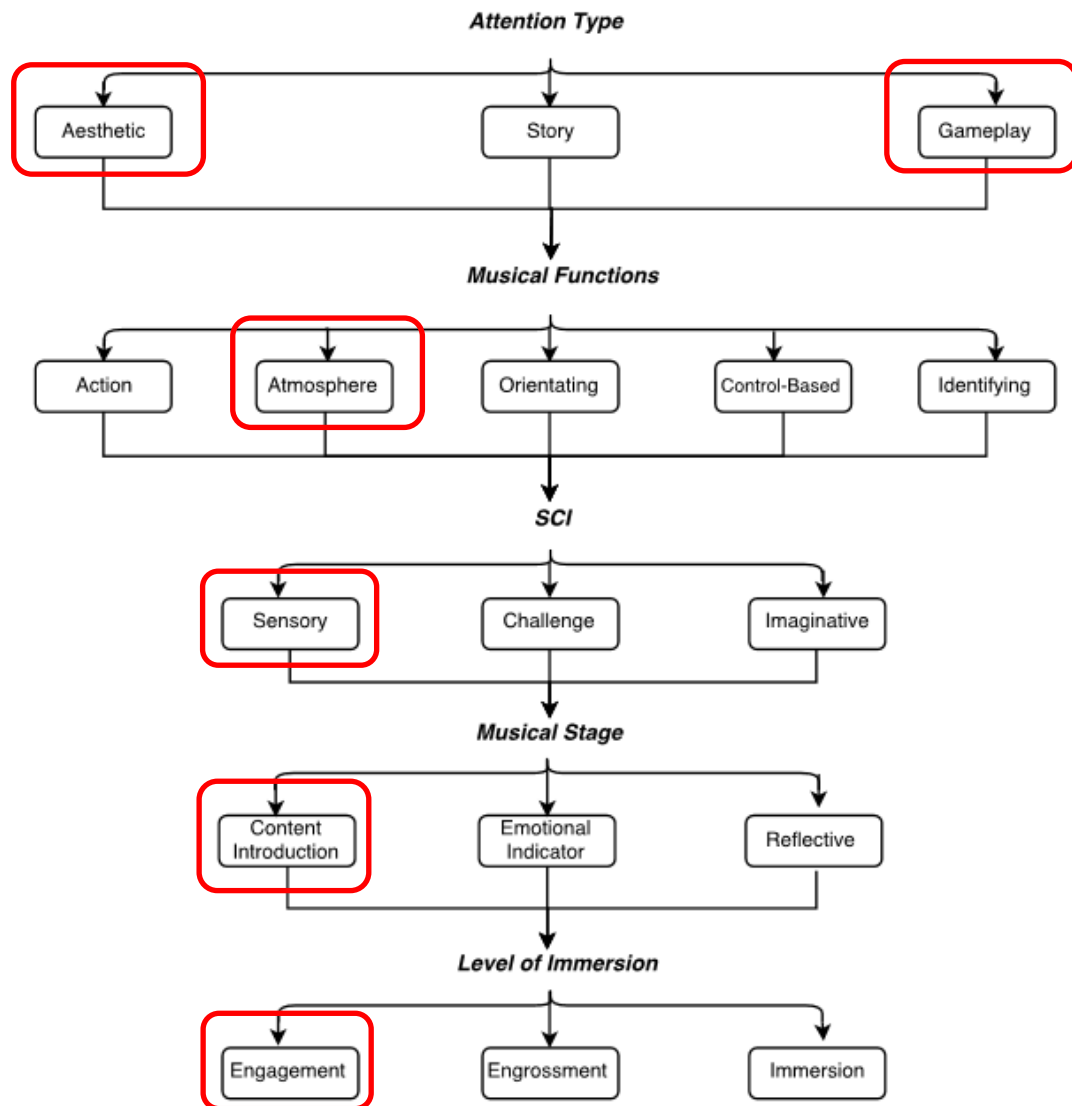


Figure 4.7. Theoretical Immersion Framework, annotated for opening scenes of *Limbo*

4.3.3. Introduction and Handling of Melodic Content

The first instance of a shift in atmosphere and instrumentation from the textural music can be heard just before the forest section at 02:58. This scene proved to be one of the most difficult moments of the score to write for as I wanted a shift in the function of the music and to prompt a change in the player's perception of the role the music was playing. It was during this vital point in the narrative that the protagonist has one of the last moments of innocence in the game and so I thought the primary emotions should be

strengthened aurally. The introduction of the piano, clarinet and bassoon is intended to prompt a change in the listening behavior of the player and is the first time they will be presented with what can be considered as melodic content, temporarily foregrounding the score above the gameplay and aesthetics. The player is presented with something they could consider as having a metric feel, for this reason the clarinet melody is easy to follow with no daring movements in the rhythmic or melodic content (see *fig. 4.8*).



Figure 4.8. Forest Scene: Clarinet reduction (4:07)

The music is dictating the narrative and becoming interactive (Qin et al., 2009). The scene requires the player to jump from branch to branch in the trees, an archetypal child-like action that promotes control-related functions, therefore was something that I felt needed to be emphasised aurally (Jørgensen, 2006). By offering a simple arrangement of three instruments without a veil of effects, it is intended to serve as genre synecdoche when combined with the protagonist's actions the score is intended to encourage the prospect of a nostalgia induced immersion (Pozderac-Chenevey, 2014). By providing a score and gameworld that could contribute or create an additional meaning for the scene, separate to

what is literally being shown or displayed to the player, demonstrates this sections ability to allow “participatory supplementary connotations” (Collins, 2008). Through these compositional techniques the music is providing optimisation by assisting the comprehension of the narrative and strengthening the possibility of a connection between player and gameworld; resolving ambiguities in the visual message (Huiberts, 2010; Federoff, 2002, Cohen, 2000).

I purposefully introduced the piece as the player is encountering hostile environmental dangers, such as bear traps and boulders for the first time, this was to engage with any atmospheric functions and reflect the protagonist’s feelings. The bear traps and boulders do not represent one of the main threats that the boy has superimposed into the limbo state, based upon his own fears of death and so I chose to treat them without the same musical poignancy. Of course this is my own interpretation of the narrative, though in my opinion elements seen later in the game, such as the spider and water, represent a fear that the boy is holding onto. For example: water represents the boy’s disposition towards death and the helplessness that he feels surrounding it; and the spider embodies his fear of death itself, and so the tonal language for both differs. The game attention type is now clearly focusing on the story, supported by the atmospheric functions the music is offering and the imaginative immersion it is promoting. As emotional influence could now be possible through primary and secondary pairing, as well as the nostalgic immersion it is allowing to be present, the music can also be viewed as an emotional indicator and because of this, I believe that the player will already be in the engrossment stage of immersion.

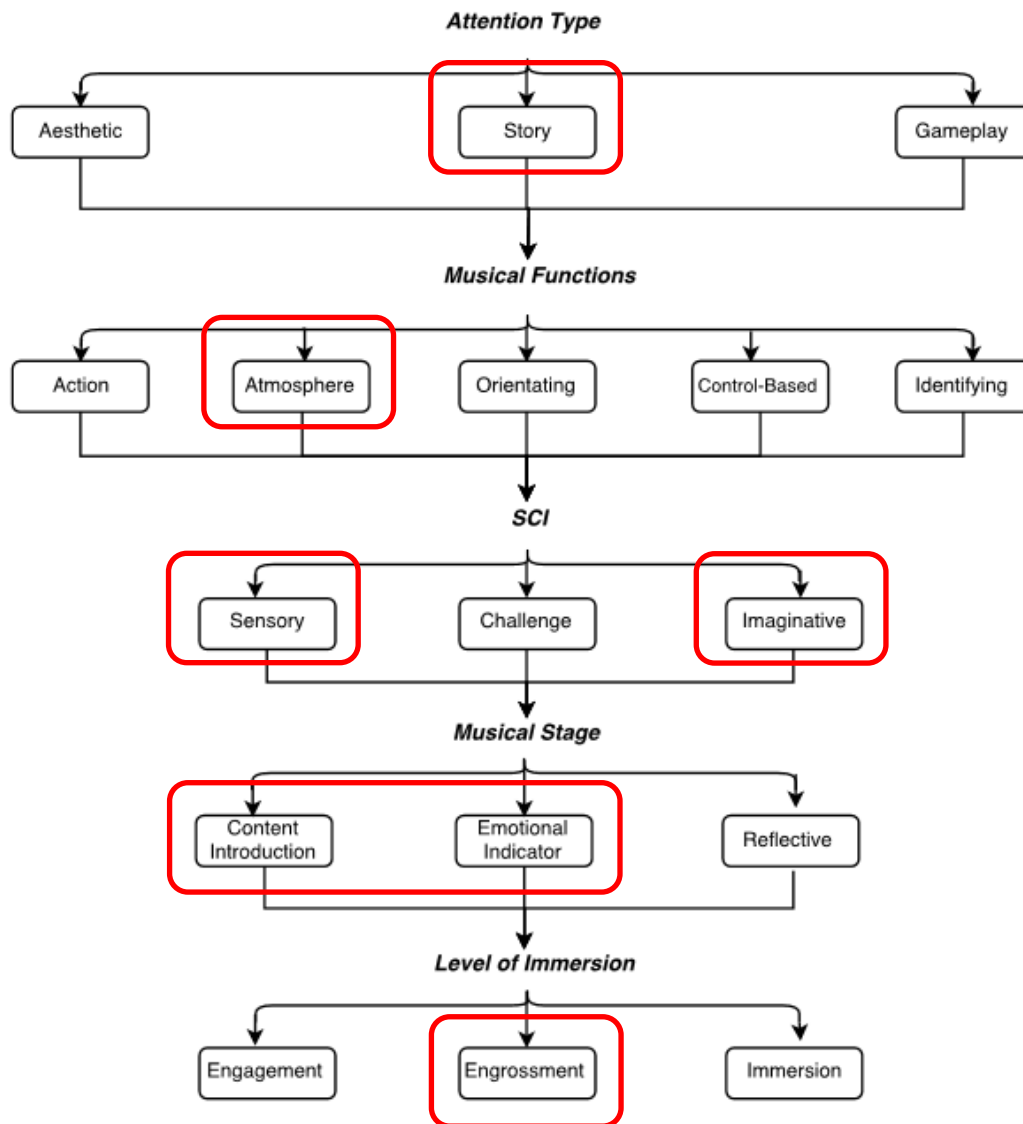


Figure 4.9. Theoretical Immersion Framework, annotated for Forest scene of Limbo

I was conflicted over this section, due to the possible interpretation that the music was too compositionally obvious. However, the music was composed in accordance with the five sections of the immersion framework and its existence can be justified through this. Although, the material used may seem reserved, the theoretical and compositional intention behind the score was not. The scores focus, first and foremost, is to serve the player by promoting immersion, not to demonstrate my technical abilities as a composer. By creating a passage of music, that whilst compositionally interesting, made it difficult for the

player to either a) concentrate on the aesthetics of the game or b) retain the melodic content of the score, would have undermined the reasoning behind the inclusion of the music. The use of unambiguous melodic and tonal language also reduces the possibility of codal incompetence occurring and as this was such a key moment of development in the game, I was eager to avoid it at all costs (Tagg, 2013). The melodic lines of the clarinet and bassoon created a basis on which the player could expect the pacing of the music to remain constant and thus knew the direction in which the score was heading. This will hopefully reduce and eliminate the possibility of unexpected transitions between attention types and musical stages during, what is intended to be, a moment of calm and reflection.

During the *Forest* scene the player cannot die and no enemies or dangers to the player are present at all. When the gameplay is taken into account with the music, it can be seen as encouraging a calming environment for the player, creating a 'lean-back' moment in the game and promoting a brief 'Zen-like' immersive state (Bogost, 2011). This will adhere to the safety/danger states associated with many video-games that exploit the conscious engagement the player has with game and the unconscious influence the music may have. It is also important to consider that the player is still adapting to the controls and mechanics, this section is the first time the player will be understanding the mechanics needed later in the story and so could be viewed a section specifically dedicated for this. The player will benefit from having a calm learning experience before they feel in control of the game through their learning of adequate motor skills. In addition, the nature of the soundtrack at this point further reinforces the functions of the scene and when paired with the gradual but noticeable change in timbral and textural material it creates an opportunity for the scene to be experienced in a number of ways. These are: either creating a reflective moment in the narrative of the character and thus the player empathises *for* them; or the

player experiences these emotions and empathises *with* them. Both interpretations of the score would create a productive initial pairing between primary and secondary emotions, classifying it as identification music (Gorbman, 1987). The development of emotional involvement has been promoted where possible, using the games narrative as a platform whilst simultaneously providing a non-overtly intrusive score that will aid the players understanding of the controls and mechanics of the game. Concentration, control and comprehension are all supported through the soundtrack during this scene to promote immersion, as well as helping evoke the most important trait *Limbo* offers the player: empathy (Ermi & Mäyrä, 2005; Brown & Cairns, 2004; Pace, 2004).

Leading out of the *Forest* scene, the G minor harmony is supported by the piano repeating E ♭ and C minor 3rd dyads across two octaves, with the introduction of a harp harmonically preparing the move to C minor. The harp is displaying its function as an episodic marker, providing brief one-way musical phrase passage that is marking a change in the scenes, moods and the type of interaction the player will be having between the music and game (see *fig. 4.10*) (Tagg, 1992).



Figure 4.10. Reduced harp score (4:49)

For the first four bars the harp preserves single note changes to maintain gradual pacing, passing through variations of the C minor/G Phrygian scales. However, the final two bars modulate more obviously, with the penultimate bar transitioning to C melodic minor and beginning on G ♭, before moving another semitone down to F, moving to A harmonic minor,

utilising the D as a passing note to prepare for the C in the dulcimer. It operates as an episodic marker, cueing a redirection in the musical language and instrumentation for the remainder of the soundtrack (Tagg, 1992). The score is now reflecting both the narrative and the pairing of emotions within the game, whilst demonstrating action-related and atmospheric functions because of the rhythmic content. As a result, the attention of the player will now be on the gameplay now as the music promotes an imaginative immersive style, before continuing to incorporate a challenge-based functions as the scene goes on. This is also the first time in the score the player will hear the trombone air tones and growls that act in as an earcon and will become associated with the spiders presence, working as an episodic marker (see *fig.4.11*) (Jørgensen, 2006).

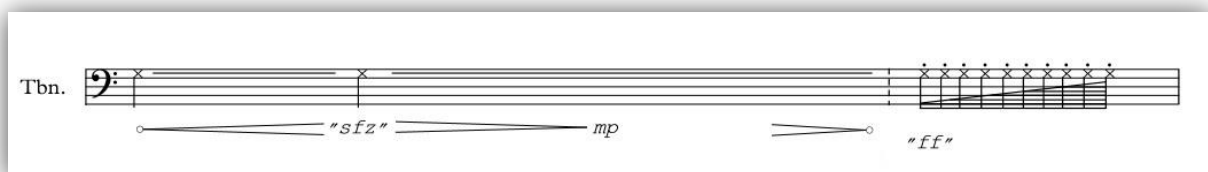


Figure 4.11. Trombone air tones (7:18)

The air tone acts a kinetic and tactile anaphone for the spider, encompassing several attributes of the spider's characteristics, as portrayed in the game, and combining them into one sound. Until this point in the soundtrack the timbrally focused scoring is incorporated to offer a primary emotional perspective that the limbo state conjures up to the 'boy', whereas the traditional instruments score the outlook and playfulness the boy is superimposing on the environment. Ultimately, as *Limbo* goes on he is giving up to a fear of what he is having to face. This is when the elements of the score combine; the traditional instruments (i.e. clarinet and bassoon) heard previously now are washed with reverb, delay and a Corpus plugin, as well as the addition of more extended techniques to obscure the attack and

release of the sound, producing a less familiar sonic vocabulary through the same instruments. Previous timbral sounds that, at the beginning of the game, could have been mistaken for environment in-game effects now sound particulated and electronic, reflecting the distorted sense of reality the 'boy' is in. A cello and trombone were at the forefront of these sounds; the techniques used include: air tones; flutter tonguing; growls; natural and artificial harmonics; heavy bowing; bow strikes on the body of the cello; and bowing on and behind the bridge (see *fig.4.12*).

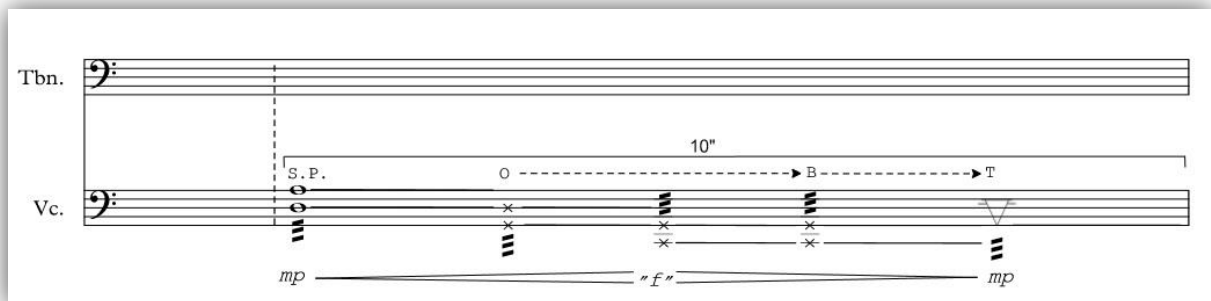


Figure 4.12. Extract from score; cello bowing techniques (8:15)

The inspiration to focus on timbrally intricate textures through extended playing techniques came from two works in particular: Giacinto Scelsi's, *Maknongan* (1993) and Liza Lim's, *Invisibility* (2009). Both pieces create delicately crafted, harmonically prosperous yet troubled sound worlds, brought to life by the suggested movement within each line. Though these sounds are undoubtedly thoughtful, the underlying angst with which every gesture is accompanied maintains the sense of a perpetual state of entropy.

4.3.4. Immersion Through Emotion

Players and reviewers talk about emotional responses when discussing the effectiveness of immersion within video-games and so the initial emotional response induced by the music was a key consideration during the compositional process. Nonetheless, I was aware that, although I may be trying to achieve a varied emotional

palette, I must do this in accordance with the developed immersion framework. To score the scenes with a soundtrack that only functions as strong evocative music would not be enough, but additionally, was also vital to ensure that any music coexists harmoniously with the game mechanics, controls and pacing throughout to guarantee it works as functional video-game music. For example: a particularly difficult part of a game that requires precise control inputs from the player may not suit an intricately scored theme accompanying it. The player's attention is going to be on the controls of the game, not the music, and so the game would much better suit a control-based focus from the music, providing appropriate audio feedback to support the player's motor skills (Jørgensen, 2006). An example of this within my score is the second instance the spider appears to the protagonist at 10:00 in, after previously capturing and cocooning the boy within its web.



Figure 4.13. Screenshot from video (10:15)

Visually, the spider's introduction into the scene evokes the feeling of predator and prey, accentuated through the slow pacing that is forced through the level design; acting to ensure the player understands the safety/danger state, and the function of the music (Whalen, 2004). Due to this, it made sense to utilise the music as an atmospheric function,

cognitively engaging the player to encourage their focus on the gameplay, especially as it is suggested that meaning of visual stimuli is only determined by the sound (in this case the music) accompanying it (Sexton, 2007, p.53). Aurally, the trombone air-tone (see *fig.4.12*) speculates the introduction of the spider; at this point in the game I would hope that the short phrase will, by now, be identifiable as an earcon for the spider. This will happen as the semiotic coding is already assigned to the sound world by the player in previous scenes, triggering a learnt response and anticipation towards the new scenario. The player does not need to consciously recall the music they are hearing but instead the music will unconsciously influencing the emotional pairing through the kinetic speculation of the spider's presence. Before this scene takes place, the manipulated sound of air tones through a rapidly tongued trombone can be heard, the sound was first heard after the introduction of the spider previously. The spider's steady yet constant movement towards the player makes for a very unnerving few moments and by gradually increasing the textures within the music as well modifying the timbral qualities of the sounds, it increases the semiotic provocation and with it sensory immersion through sensory gratification (Huiberts, 2010).

Accompanying the trombone are a collection granulated pads, bowed cymbals and woodwinds (clarinet and bassoon) that serve two purposes for the scene. Firstly, they offer harmonic indication; a D drone is played by the bass pad, whilst a B \flat is produced by a bowed cymbal. The clarinet follows moving from F, a minor 3rd from the tonic D, to E, a major 2nd interval, before transitioning to B \flat , the minor 6th, where it is accompanied in unison by the bassoon and reinforces the D harmonic minor tonality. Secondly, the purpose of the accompanying music is to enforce the feeling of genre synecdoche throughout the scene to support dynamisation and optimisation simultaneously through the tension the

scene is promoting. The choice of instrumentation and orchestration of parts played the most pivotal role in achieving this.

Concluding this series of events, a “virtual silence” (Schafer, 1977, p. 259) is added for that serves two purposes, it makes the player more alert to sonic changes, which in turn also promotes a change in attention type. The previous section will have been quite an intensive section for the player to focus on and, as Lemarchand suggests, the player is also susceptible to “vigilance fatigue” (Lemarchand, 2012, p.31). I included the silence in an attempt to reduce the possibility of fatigue occurring, due to the short length of the game. In addition, merely being involved in a safety/danger state with music reflecting this, it will have held the player’s “reflexive attention” (Lemarchand, 2012, p.39); an involuntary reaction that the player will have little control over. Instead now an executive attention type is promoted and allows the player to choose the subject of their attention (Lemarchand, 2012). By cutting to ‘silence’ it accentuates the optimisation of the scene and strongly promotes a change in the type of listening to, for this reason it will also act as an episodic marker and reinforce transition to a new scene (Huron, 2002; Tagg, 1992).

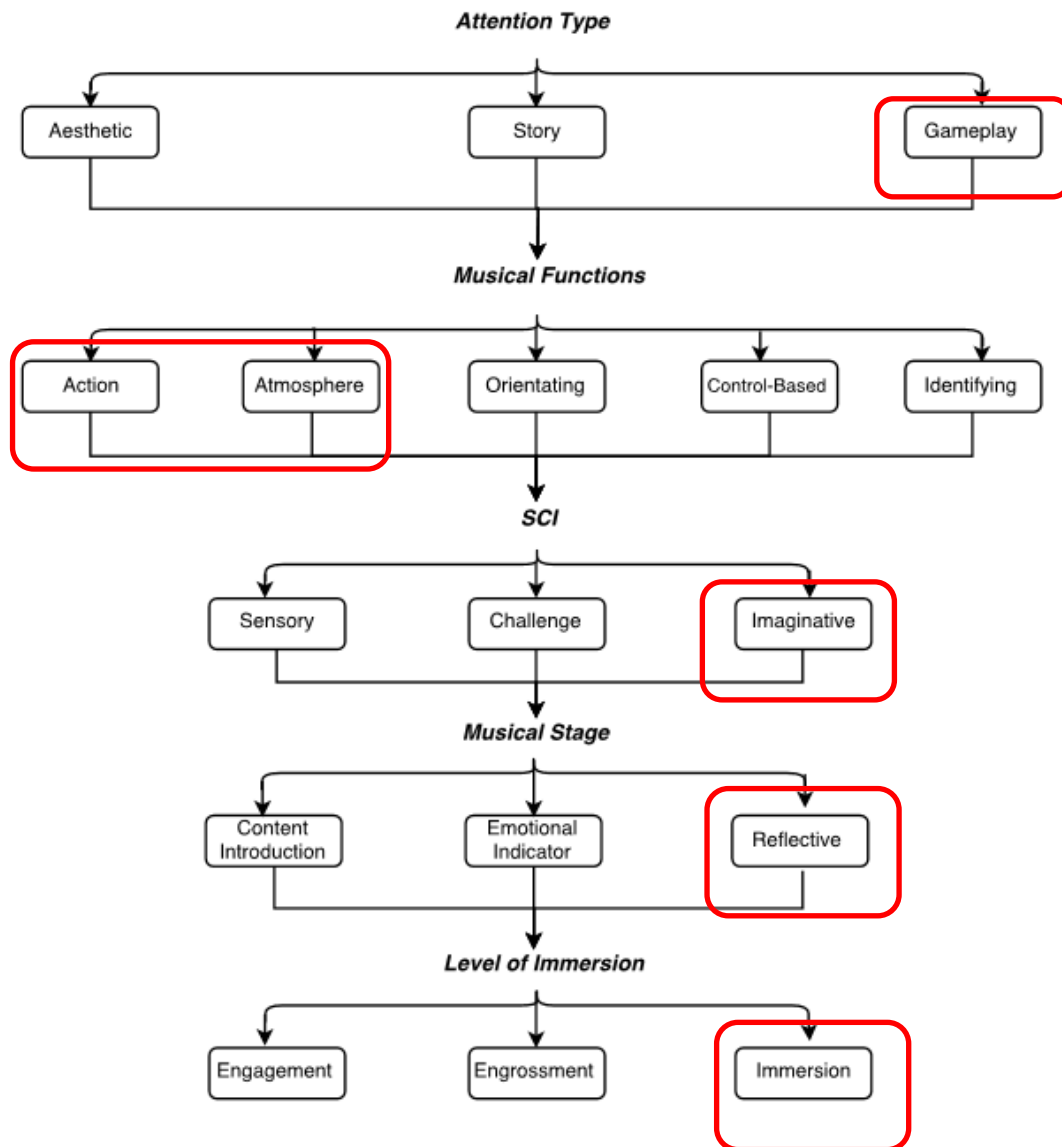


Figure 4.14. Theoretical Immersion Framework

The final moment of original music, that I believe works strongly within, *Limbo*, was directly influenced by a specific compositional technique and strategy. This was the prolation canon used during the, ‘*Canyon – The Road of Trials*’ section (see Chapter 3). The canons un-encroaching yet effective nature effect for creating a slowly evolving environment around the player was a powerful technique. I decided that it was appropriate to employ a similar method at 13:59. It comes at a time when there is a focus on motor skills, due to the requirement of a series of well-timed movements from the player to

survive. The prolation canon was used to destabilise the constant rhythmic platform on which the player had become familiar with in an attempt to increase the tension of the section and indicate the upcoming danger. The focus of the score at this point revolves around rhythm; the unsteady rhythmic based is due to the independent rhythmic content of the instruments. The $\frac{7}{4}$ ostinato phrase, played by the kettle gong, creates rhythmic tension between the bass guitar and harp. The canon comes at a moment of danger for the player and so could be cycled through and repeated if the player dies. Even when repeating the music, immersion is maintained as much as possible because the player does not feel as if the content has merely repeated and that they are restarted the scene again, instead it is a continuation. In addition, the canon works to support the transition between perceptive stages from a rhythmic control-based function to atmospheric support, as seen in *Journey*, as it maintains the attention of the player whilst transitioning between musical stages and avoid manufacturing situations where new material creates a power struggle between the music and gameplay for the players focus. The immersion framework can be annotated to identify the effect of the music on the scene (see *fig.4.15*).

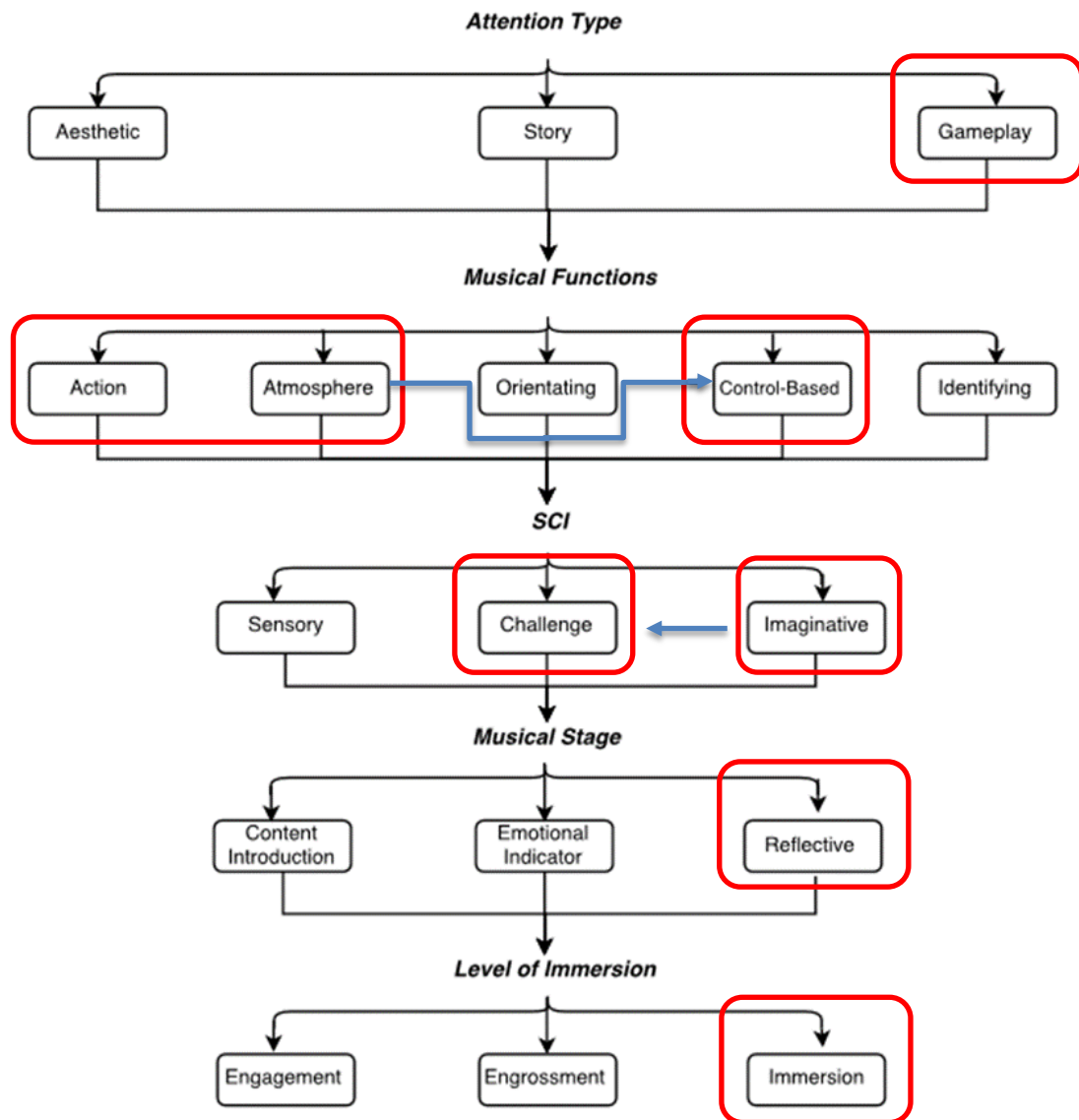


Figure 4.15. Theoretical Immersion Framework

4.4. Conclusion

The creation of a compositional reference tool in the form of a framework that aids the process of creating an immersive video-game sound track is a challenging task. Due in part to the lack of research on composition within the field, but also due to the subjective nature of immersion and its capability to polarise opinions in the Ludomusicology community. The ability for immersion to affect a player is a highly personal process, one

that may even change from day to day, and so, taking a 'one size fits all' compositional approach to video-game music will naturally work for some more than others. Nonetheless, outlining the key areas of consideration surrounding the creative compositional stages will still allow for personal styles and identifiable traits of each composer to shine through, without directing or subduing any of the material. Though I intended the chart to be usable as a standalone method of guidance, a previous knowledge of the topics and concepts covered will of course be beneficial and allow for a greater level of nuance within the resultant music. That being said, I believe that this research has provided a unique perspective, offering what seems to be an uncommon insight into the compositional process for video-game music through the analytical lens of a composer and researcher, through involved practice.

Providing personal feedback for the effectiveness of the chart is ultimately going to be predisposed as I have conducted the research in this thesis and assembled the immersion framework. However, I do believe that the research carried out, in conjunction with the model, form a useful method of signposting the key compositional considerations as well as creating a strong foothold for future research. Whilst writing with these steps and immersion concepts in front of me I noticed that the system, for me, worked as an initial point of reference when planning and considering the material I was going to include in, *Limbo*. However, once outlined, I was not strictly following the framework in isolation, rather I was drawing on my knowledge of each individual concept included and opting to employ my understanding of the theories encapsulating them. Despite this, it does not lead me to conclude that the framework is to be used as a merely as a 'check sheet', nor alternatively to be strictly followed as a rigid process for writing, but instead exposes my personal bias towards this area of research and method of approaching composition. It also

highlights the value of subjectivity in his field of study and with it, the lack of definite conclusions we can arrive at without being superseded by personal experience.

In truth, video-games will not always immerse its players solely through the use of music, though, at the very least, the soundtrack should never impair the games ability to achieve immersion. Writing immersive video-game music is much more than creating a wonderfully elaborate soundtrack that bombards the player, though to the masterful few this delicate line can be traversed with astounding results. The research I have conducted in order to write this soundtrack has outlined the importance to have a balanced relationship between the musical parameters of the game and the visual components of its design it is accompanying. When working harmoniously they allow for the game to breathe and interact organically with its many contributing factors, and for the best possible experience for the player, each facet of its design must be supported at all times. Upon reflection, perhaps this is what the model demonstrates and promotes best, through its many areas of research; when to allow the score to take center stage and when it must act as a foundation to create the holistic immersive experience. To compile a fully formulaic method of creating this effect would remove any traces of human nature and impulse from the music. In the end, this is what makes immersion such a sought after experience; it belongs to the player. As a composer or game designer all that can be provided is a platform from the which the player accepts and engages with the conditions offered, before assigning their own meaning, understanding and logic onto a world which they will make their own and become sustained within. When explained in words and models it is easy to forget about the natural, indescribable power that immersion can have over a person. Virtual emotions and actions become tangible, and the distance between gameworld and player diminishes until, just maybe, they feel one in the same thing.

4.4.1. Future Research

Moving on and developing upon the research offered in this thesis, I would like to see a more sophisticated and refined version of the immersion framework, in order to allow the continuation of framework based analysis and composition. I also believe that this and future frameworks could offer a great deal when used as an effective educational tool for new composers and ludomusicologists to outline the key areas and theories required to develop an understanding of immersion. In addition, to develop this framework and future versions of it, the feedback of other composers responsible for the creation of video-game soundtracks would be invaluable to further refine the process. However, I think this framework serves as a strong foothold for future research and as a platform for the development of a deeper understanding into the relationship between and immersion in video-games.

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