

An Exploration of Interdisciplinary Dialogues between Sound, Vision and Movement: A Music Composition Methodology for Interactive Media (Video Games)

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1. Introduction

This article describes my compositional approach to interactive music for video games. Exploring production techniques and integrating audio into this medium, it emphasises the interdisciplinary dialogue between sound, vision and movement, which brings all these elements together.

Musical composition, for any medium, is a part of the audio-visual experience that adds depth and emotion. In the context of video games, musical composition comprises sound, vision and interactivity. These interdisciplinary elements support and complement each other under one artistic concept. In other words, they become inseparable.

The main functions of music in media are to transfer the feeling or mood of the narrative or plot, to define the identity of the characters and settings, and to emphasise the dramaturgy of the full picture. In this

regard, film music and game music share a function, which is defined by Collins in her book *Game Sound: An introduction to the history, theory, and practice of video game music and sound design* (see Collins 2008: 5).

In media, such as films, the media is fixed in time. Paul Hooffert mentions in his book *Music for New Media: Composing for Video Games, Web Sites, Presentations and Other Interactive Media* (2007: 5), that ‘linear content is well suited to linear media, such as books and television programs that have fixed lengths and are designed to be experienced from beginning to end’. Fixed media is closely bound to the film edit. The music can be perceived as a linear audio line that is composed along to the edited image, and, vice versa, the video edit is created to sync with the audio. In video games, the game engine storyline is interactive, and the player participates directly with a set of options embedded within the game engine framework. This interactive aspect creates an exciting challenge to video game composers: to think differently and to apply their music to different circumstances, depending on the player’s decision.

Immersive experience in films and games is different. In films, it is more detached from the listener because they are watching stories about characters other than themselves. However, in video games the player is the character who experiences the dynamics of the game engine and constructs the virtual reality, albeit with limited choices. The game engine and the game music is designed to evoke and stimulate each player’s emotions (happiness, sadness, fear, etc.) and instincts (survival, protection, etc.) through the gameplay in real time.

The term ‘interactivity’ has been described and associated by Collins in her book *Game Sound: An introduction to the history, theory, and practice of video game music and sound design* (2008: 3) as the

way of human engagement with the material/ content. However, the term ‘interactive music’ has multiple meanings. On the one hand, it can be applied to contemporary classical music, an example being John Cage’s *Music of Changes* (1951) where the performers randomly engage with the given material/ information. On the other hand, it can also be applied to generative music (such as Koan software), where the music interacts with the computer/ machine and is generated by a system component that has no discernible musical inputs.

In video games, the user interacts with the console, the game environment and the storyline or narrative. However, this engagement is based on reaction rather than interaction. The player engages with a set of pre-programmed options, but cannot anticipate future information. In the games industry, the term ‘interactive music’ refers to all audible elements, which change dynamically based on a player’s decisions in real time.

All audible sounds in computer games can be categorised into three groups:

1. Interactive Background Soundtrack (underscore/ cue) – this can suggest emotions, or create an atmosphere through the manipulation of listener’s expectations (harmonic/ dynamics/ tempo) in response to the narrative. (Stevens and Raybould, 2014:149).¹
2. Sound Effects (SFX) – these synchronise directly with players’ actions and interactive objects to communicate meaningful game information. For example, the sounds associated with running or

¹ Where *underscore* refers to ‘instrumental score music used in a film or television production to enhance the storyline, message, emotions, action, or other aspects of the production.’ (Anon, 2010)

jumping, picking up an object, etc.

3. Voice Over (VO) – speech of the characters, audible lines of text, etc.

In video games, the movement of the player's avatar in the virtual environment, as they travel along a narrative trajectory, guides the conception and development of interactive music sequences. The interactivity of this is determined by locations and events that are triggered by the player's actions and movements in a specifically designed virtual environment. This interactive soundtrack functions as a hybrid cinematic underscore; this is a variable and open-ended musical composition that can support a narrative experience by creating atmosphere, foreshadowing/foreboding or a heightened sense of action/energy depending on the requirements of the story. Layering complementary, but functionally diverse, sequences on top of each other (via the looping, building manner of commercial EDM music (Butler, 2006)) creates variations in intensity and the composition's narrative purpose. The player's interaction with the game determines the structure of the music. At the same time, the player's movement is emphasised by the sound effects relating to the objects and actions of the player, such as the sounds associated with running or jumping, picking up or dropping an object, firing a weapon, opening a door, and so on. Whereas in video games, sonic elements are interactive, in fixed media such moments are linear and spread along the artwork's structure. In both cases, but in different ways, movement and sound inform the shape and trajectory of the piece.

2. Methodology

During the pre-production stage, an audio design document is created detailing exactly what sounds and audio will be required, as well as defining the aesthetic of these sounds and the major elements of musical development. This is achieved by working closely with the developers to identify the key parameters and interactive points.

It is the music and sound effects that make a game unique. The music can help you understand the genre; it embellishes the environment and the characters, fleshing out the characters' emotions. The music also helps to describe the story, and the time and location the game is set in. Even more importantly, the music makes the gameplay experience more memorable and distinctive. For example, the game *Super Mario* has distinctive, memorable music that becomes part of your gaming experience. It immerses you into an imaginary world.

For game composers, the most important task is to create a world of sounds and music that matches the vision and aesthetics of the game, but also to set up a pleasurable experience for players which can elevate the production value of the game itself. Interactive music and the game engine should operate together according to the narrative's options. As a result, interactive soundtracks should be flexible and adapt to the workings of the game. The range of possibilities available to the player informs how the soundtrack is to be conceived and constructed.

Video game composers usually work with a team of game developers, audio production and post-production engineers, sound designers and software coders. At the beginning of the collaborative process, the game might not be completed. The game playable prototype could be a first version of a concept rather than the game itself. The form of the musical soundtrack is designed and composed according to all possible storyline directions, and is agreed upon among

the team members prior to commencing the soundtrack.

It is possible to define audio-visual connections in a number of ways such as stylistic expectation, harmony, consonance and/ or dissonance, and instrumentation. When creating music and sound for various communicative, emotive or atmospheric purposes – whether they are supporting a narrative (in the case of hybrid cinematic underscoring), or simulating physical properties (actions and SFX) – I am aiming to generate musical information that provides the listener/viewer/player with a range of related possibilities, or what Gibson refers to as ‘affordances’ (Windsor, 2012: 1-19). When it comes to writing music for games, composers cannot always freely create music – they must do what the game requires. It is important that developers approach composers with a very clear vision of the game.

To set up the aesthetics of the game it is important to know what the developers want such as what kind of sounds they are looking for and how they perceive the game. It is not always easy for them to define instrumentation or musical genre because not all game developers have the same musical skills as the composer. To put together a musical style guide (called the ‘temp score’) and instrumentation, composers and developers have conceptual conversations; this is also an opportunity to ask each other their questions. They use short-term communication in order to garner an idea of what kind of music would be suitable. What is the genre of the game? What are the visual gameplay aesthetics? Also, it could be useful to ask the developers to provide images or screenshots of any gameplay, because as soon as there is an image, it speaks very powerfully. Visual aesthetics can define the game genre and how the game sits alongside similar games. One must manage the desire for personal innovation alongside the traditional video game style. This is because being an

innovator is about being aware of what is innovative and what is traditional.

Composers ask the developers about their musical preferences in terms of style and genre, while trying to understand the taste of their collaborators. What is their favourite music? What do they listen to? For example, in my produced score for the game *Thing-in-Itself*, during conceptual conversations between myself and the developer we discussed the general plot and ideas of the piece, joined with the dynamics and tempo. Arseny Klishin, the game developer, provided me with musical examples by other artists, which in his opinion matched the ‘mood’ of the game. Next we defined the instrumentation: the score will be comprised of guitar, piano, strings and ambient synth pad, followed by what not to include: modern electronic dance music genres and heavy synthesisers. This game is set in 2016, in the flat of two young adults in an English-speaking country.

‘Thing-in-Itself is an interactive short story about the struggles of understanding another human being. Using Immanuel Kant’s concept as a framework, it leads the player through stages of a relationship, exploring how perceptions may clash and surroundings can alter. [...] Ted and Molly are together. Ted feels a connection to Molly wherever he looks. But, how do they both really see the relationship? [...] With an average walkthrough time of 15 minutes, *Thing-in-Itself* is not a game in a traditional sense – it doesn’t have win or lose conditions and doesn’t present challenge to the player. [...] With this project, *Party for Introverts* attempts to establish a connection between the mediums of game and short story, reworking the possibilities when narrative and interactivity merge.’

(Klishin, 2016)

To define instrumentation, I asked conceptual questions to create a picture: the details of time, place and situation. We defined musical

preferences that would work for the score.

To use:

Acoustic guitar, strings, piano, electronic ambience.

Tempo: middle tempo, not too slow, not too fast.

Harmony/ mood: minor key.

Not to use:

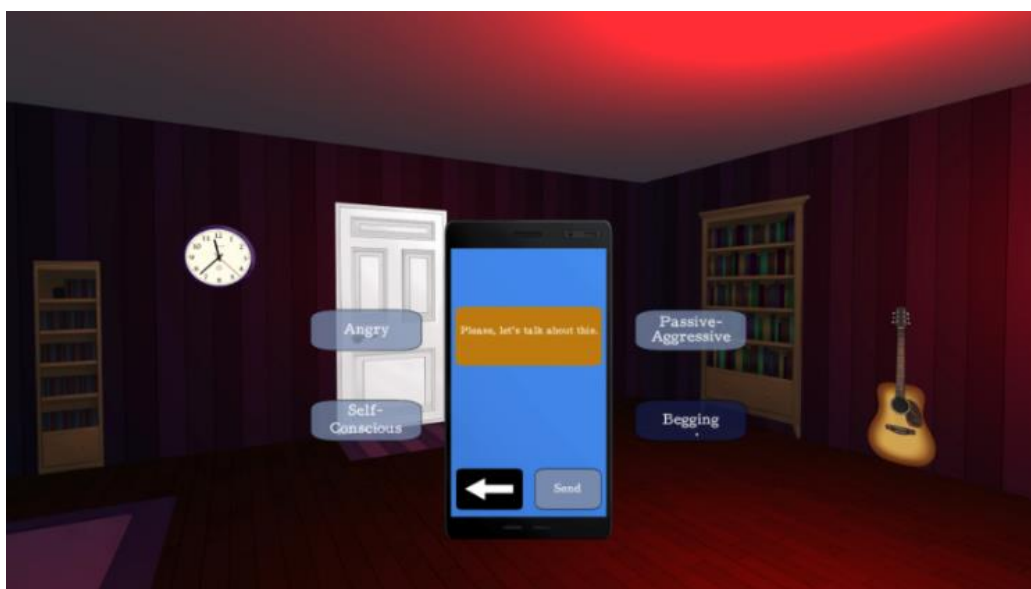
Electronic dance music, modern beats, unusual time signature, most electronic synthesisers. No wind instruments, such as flute, brass, and no more modern grooves. Because they really wanted to keep it clear, in that very personal first person perspective concept.

Together, we had the elements, what we are/were going to use (instruments), and the harmony (minor key). The developers sent pictures (and screenshots) (Figure 1 and Figure 2) of the game, the composing the musical cues to begin.

Figure 1. Example (A) screenshot from developers ©



Figure 2. Example (B) screenshot from developers ©

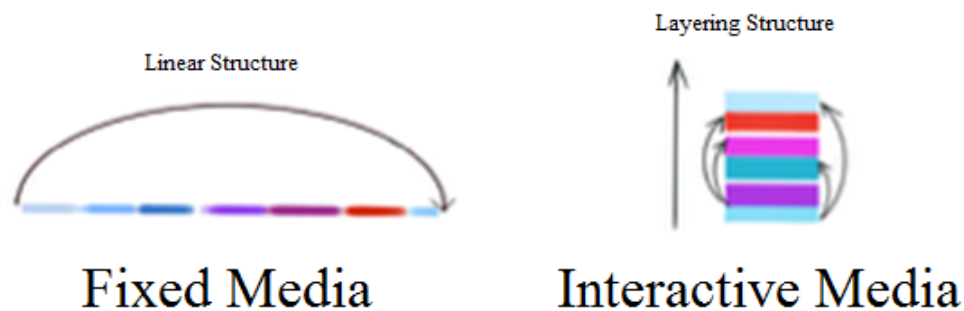


3. Interactive Music Structure

The structure of fixed media or interactive media soundtrack follows the narrative. In fixed media, musical structure is a set of cues

from the beginning to the end. In interactive music, the length of cues is undetermined and may depend on various factors, such as the game parameters or player's decisions. For this reason, the basis of an interactive score is nonlinear. One way of solving this issue is to create an interactive composition from small looped pieces, which could be switched quickly in relation to player's psychological and emotional needs, in relation to the narrative (Figure 3).

Figure 3. Fixed Media vs. Interactive Media



After all stylistic aesthetics and instrumentation is set up, the next step is to define the structure and the dynamics of musical development, which will emotionally draw people in. The music should be showing its natural involvement in gameplay, which can include tempo changes, adding new textures or instruments, etc.

Different composers approach video game composition in different ways:

1. Composing music and then adapting the existing score to the game environment.

2. Thinking about each triggered step in video game composition at the process of music composition.

My compositional techniques are similar to music production methodologies for interactive media as suggested by Richard Stevens and Dave Raybould in their article '*Designing a Game for Music: Integrated Design Approaches for Lucid Music and Interactivity*' (Stevens and Raybould, 2014: 151), which is ornamental, parallel, transitional, cellular and algorithmic forms.

4. Compositional Process

In my creative practice, I build audio-visual dialogue with cinematic underscore and SFX by firstly analysing the media, in terms of mood, structure and dramaturgy. Then I plan chord/ harmonic functions and stylistic expectations (Nielsen, 2011), which will respond or correspond to the emotive story of the moving image. Alternatively, the future composition could start with a collaborative interdisciplinary plan between dancers or video game developers.

Often my compositions are constructed of several small 'cues' which can tightly fit the narrative. When working with an interactive piece, constructing a composition out of small parts (cells) allows me to build complexity. Fixed media musical composition structure is made up of a linear group of cells; in interactive music composition the structure builds upon one or more vertical/ layered blocks of cells. My approach to interactive music creation is based on creating loop-based musical elements that can be combined vertically, programmed into the game to play out in relation to the particular narrative movement or a change of environment. Composed 'cells' for linear and interactive

media composition (which creates an illusion of musical development and linear structure with interlocking layering technique) support the visual movement and complement the narrative. Using EDM as a structural/stylistic device allows me to build my media composition.

In interactive media I build my compositions from the set of cues composed in relation to the game narrative. However, each cue is deconstructed into vertical layers (vertical re-orchestration/ stems) and triggered in the media environment in relation to the game's narrative following a logical sequence of musical development. Applying these techniques creates a composition that is both structurally controlled, but also open-ended. Composed and triggered cues work in vertical combinations to maintain the musical continuity while allowing for significant changes in texture, harmony and instrumentation. Composed SFX linked to the interactive objects and items in response to player's actions complement cues in the shared musical space. All sounds are mixed and placed into the virtual environment with Wwise.

Music and sound effects can be produced and recorded with DAWs, (digital audio workstation) such as Logic Pro X, Ableton Live, ProTools, Reason, etc. Audio files are usually delivered in WAV format, OGG format for mobile VR (virtual reality). When the music (interactive soundscape) and SFXs have been produced, all the audio-files have to be implemented into the virtual game environment. To integrate all audio files, some sound designers use middleware, such as Wwise, FMOD, where additional sound editing needs to be completed. This includes volume balance between the audio files, attaching sounds to interactive objects, applying 3D plugins (if needed), mixing all the elements together and then compressing the final mix, in order to save space.

Development software, such as Unity and Unreal Engine 4, have their own simple audio implementation tools. However, depending on the game complexity, middleware might need to be added to the sound design process as well. Understanding middleware for composers is very important, because the techniques can offer new options of musical triggering. It can allow manipulation with the musical ‘material’ in many possible ways. It makes you think about digital environments as a compositional space, and its ability to expand imagination and creativity.

Interactive music sequences or loops could be running from simple melodies, up to a complete musical arrangement. Triggering loop-based audio elements into digital space, in relation to the location of the character or the level, creates an interactive nonlinear score, which can be constructed from many musical elements which are playing on the loop at the same time. It is possible to produce these elements with any DAW, to create a short piece of music with lots of instrumental layers within. Then to break this short piece into the multiple instrumental layers, triggering them into the game in relation to what is going on in the narrative. Sound effects are attached to the movement of the characters or interactive items, to something that will always produce the same sound(s). Voice Overs could also be triggered into the digital game space or game parameters. A technical issue for music composers, producers and video game developers is that most DAWs are developed for Macintosh (Mac), and most of video game development software is native to PC (Windows). This technical incompatibility can slow down the creative process, however, I believe this does not affect the quality of the final production in any way.

When designing multiple layers for the narrative, it is important to remember that games are created to be played multiple times – the

soundtrack should be musically interesting and diverse whilst also extending a sense of musical development.

Karen Collins suggests ways to add musical diversity to instrumental loops, possible requirements for a video game score, and game composition process stagers in her book, *Game Sound: An Introduction to the History, Theory, and Practice of Video Game Music and Sound Design* (2008).

Diversity for the interactive layers/ loops:

1. Variable tempo
2. Variable pitch
3. Variable rhythm/meter
4. Variable volume/dynamics
5. Variable DSP/timbres
6. Variable melodies (algorithmic generation)
7. Variable harmony (chordal arrangements, key or mode)
8. Variable mixing
9. Variable form (open form)
10. Variable form (branching parameter-based music)

(Collins, 2008: 148)

Requirements for a video game score might contain:

1. Attractor loop
2. Start-up Screen
3. Level 1 (might contain various number of layered cues)
4. Level 2 (might contain various number of layered cues)
5. Level 3 (might contain various number of layered cues)
6. Success
7. Failure
8. Ultimate success
9. Ultimate failure
10. Credits

(Hoffert and Feist, 2007)

Game composition process:

1. Review the basic imagery
2. Review the basic story
3. Find out the number of musical cues required
4. Find out formats for delivering soundtracks (usually 8 stems track – allocated among rhythm, percussion, lead/melody, harmony/secondary lines, pads/strings, and specials). Mono, stereo or surround sound?
5. Identify the key points in the story arc will require special musical attention (reaching thresholds, winning battles, advancing to next level, or game suspension while the gamer sets parameters in a window.
6. For each primary game character, mock up (demo) music for each of the story points.
7. Work interactively with your production colleagues, revising and finding until you get approval.
8. Compose the cues
9. Deliver in a DAW project

(Hoffert and Feist, 2007)

5. Virtual Reality

The principles of mobile VR game music composition are similar to other games. However, the lack of space affects the audio delivery format (OGG for mobile VR). Sound design techniques might be different, depending on the game, the console and extra tools (such as gloves, walking stations, etc.) and on the player's role and placement in audio space (Unity, Unreal Engine, Wwise, FMOD). Then a more technical understanding of the game console and more new musical ideas can be brought to the interactive composition.

6. Conclusion

Throughout this article I explore the interdisciplinary dialogue between sound, vision and movement in a music composition methodology for interactive media. I look at musical composition as a part the audio-visual immersive experience, where several elements need to be taken into account, such as music composition, production, pre-production and sound integration into the video game medium. Interactive music structure is shaped by the game engine design and its progression throughout gameplay in regards to players' decisions. This approach enables us to look at the construction of interactive soundtrack in a vertical way, using loop-based audio materials attached to the media environment. I believe that a technical understanding of music implementation into the medium can assist composers by bringing about a larger range of creative ideas in composing music for video games.

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