

Ludic Composition in Video Games

Introduction

While video game music is a relatively new medium, subsections of the discipline, particularly in the realm of single-player experiences, are well understood within both the industry and academia. The challenge of synchronising music to a medium that, by definition, has some element of nonlinearity has been addressed successfully in many ways as exemplified in this text by games such as *Celeste* (Maddy Makes Games, 2018), *Hollow Knight* (Team Cherry, 2017), and *Final Fantasy XV* (Square Enix, 2016).

It can be argued that the competitive multiplayer side of the industry is underserved by, or perhaps even incompatible with music. It will be argued that the chaotic, player-driven nature of such games renders established methods for creating interactive music far less effective in many multiplayer games than their single-player counterparts.

This paper examines the reasons for this, and in reference established methods and concepts in the field, as well as readings of a selection of games, proposes a framework for applying music multiplayer gameplay. It will explore music's relationship to the rules/fiction model of games as described by (Juul, 2005), and how the almost total reliance competitive multiplayer games have on their rules (rather than their fiction) presents a unique challenge for composers.

Interactivity and its relevance

Firstly, in order to examine interactive music as a medium, a definition of 'Interactivity' in relation to art is required. There are various arguments as to what constitutes *interactive art*. It has been argued that all classical and modern art is 'interactive'.

"Ellipses in literary narration, missing details of objects in visual art, and other representational 'shortcuts' require the user to fill in missing information." (Manovich, 2001, p. 56)

To paraphrase, Manovich asserts that the act of *interpreting* art constitutes interaction.

(Barbrook & Cameron, 1996) contrast this idea, defining interactivity as "not referring to being able to read or interpret media, but to physically act, with agency, with that media". This is an important distinction when discussing video games, as a player's agency to affect the fictional world, and the game's visual and auditory response to their actions are integral to the medium.

When consuming a video game, a player must interpret the game's output, make decisions, and input instructions (usually in the form of a button press) for the game to then respond to by changing its output in some way.

The player is changing the state of the media, and therefore is acting with agency upon it. While missing details of an object in visual arts may affect the viewer's interpretation, it in no way physically changes the state of that object. Ergo, the viewer does not act with agency on said media. A piece like this will be referred to here as *linear art*, meaning art that always gives the same output. This applies to media such as film, prose, and *recorded music*.

Consider for example a sculpture made of unfired clay, where visitors are encouraged to mould it as they see fit. They move on, and somebody else repeats the process. Under Cameron's definition, the audience had 'physically act(ed) with agency'. Therefore, interactive media requires a consumer to act on that media in a way that changes its state or form.

(Collins, 2008) paraphrases author (Rouse, 2004): "The most important element of interactivity, and that which gives interactivity meaning, argues Richard Rouse, is *nonlinearity*..."

So, for the interactivity of a piece of media to be meaningful, it must in some way change its state based on a consumer's input. In other words, it must be nonlinear. A core part of creating any interactive media is therefore to define the interactions that convert the consumer's input into a given output, which can apply to the creation of both digital and physical sports and games.

Thus, a fundamental property of interactive media is nonlinearity.

On video games, (Juul, 2005) refers to the aforementioned interactions as "rules". He defines video games as a combination of rules and fiction, where the fictional world responds to the player based on the game's rules.

These rules can also be referred to as *ludological elements* (from the Latin 'ludere' meaning 'to play'). (Lexico, n.d.) which will be used here to refer to things that are related to the rules of a game.

Generally, through some combination of rules and fiction, games tell stories that can change and evolve based on the player's input. Even abstract games, those without fiction, create stories. However, these stories apply to the player rather than to fictional characters. Regarding this, Juul writes that "rules themselves create fictions". (Juul, 2005)

An example given by Celeste Creator Maddy Thorson begins with her discussing the overarching fictional narrative of Celeste. "At a game level, Celeste is about a girl climbing a mountain." (Thorson, 2017)

When talking about the gameplay level of the game, she says she visualised each individual challenge as a story. Interestingly, when she gives an example of one of these written stories, she tells it in the first person. “I jump over a pit of spikes”. (Thorson, 2017)

There are games, however, (or more commonly today, parts of games) that have fully linear and non-interactive music.

Tetris (Pajitnov, 1984) has a linear soundtrack, while *Pong* (Alcorn, 1972) has no composed music at all.

Works such as these show that games can be successful both financially and artistically without the use of interactive music, so why is interactive music near ubiquity today?

Interactive music is beneficial to games for two primary reasons.

Firstly, it addresses the issue of repetition. Many games are designed to be played and enjoyed for hundreds, even thousands of hours.

In *Emotion in Video Game Soundtracking*, Williams writes: “Early solutions such as looping can become repetitive, and ultimately break player immersion.” (Williams & Lee, 2018)

Not only can repetitiveness in game soundtracks affect the listener’s experience of them, but it can also affect the player’s suspension of disbelief in the game’s fiction and rules.

The other main challenge in composing for video games is maintaining emotional congruence with an unpredictable, non-linear piece of art. Williams continues: “Soundtracking videogames presents a unique challenge compared to traditional sound-for-picture (i.e., film and television soundtracking) in that the narrative of gameplay is non-linear. Player dependent actions can change the narrative and thus the emotional characteristics required in the soundtrack... Game audio requires at least two additional challenges over other sound-for-picture work; firstly, the need to be dynamic (responding to gameplay states) and secondly to be emotionally congruent whilst adapting to non-linear narrative changes.” (Williams & Lee, 2018)

Examples of this can be found in abundance in the *Final Fantasy* series. Speaking on *Final Fantasy XV*, (Iwamoto, 2017) says they used interactive music to “enhance the user’s emotional experience by playing music that is more suitable to the situation”.

In order to do this, the game must be able to arrange and transition between different pieces of music depending on the state of the game. Not only do composers have to write music, but they must also write the rules that govern its arrangement in-game.

Referencing his career, games composer Peter McConnell says, “Part of scoring was programming - we could add our own custom logic layer”. (McConnell, 2015)

Iwamoto gives an example of how he used the design of these rules to musical effect. In *Final Fantasy Fifteen*, there is a bird called a Chocobo. The player is able to ride this bird and its musical theme changes depending on whether it is running or walking.

Iwamoto notes that the transition from walking to running is faster than its inverse. While there are only two music tracks for the bird, varying the in-game speed of the transition allowed Iwamoto to vary the intensity of the dynamic shift in the music. This ultimately reinforced the emotional intent of the Chocobo's gameplay by giving the player quick and impactful musical feedback when they start running and softening the emotional impact when they slow down. According to Iwamoto, this is because the player "doesn't always intentionally stop running... but not vice versa". (Iwamoto, 2017)

This shows how the rules governing the arrangement of dynamic music can musically express aspects of a game's fictional and ludological elements.

He also mentions that the faster the game responds to a player's input, the more strongly a player can build an association between their input and the game's output. This is a strength of vertical composition, as it can change instantly without compromising the musicality of the piece.

Iwamoto notes two distinct methods for implementing adaptive music, which are used in varying amounts depending on the gameplay situation. These

The first is Vertical Arrangement, While he uses the term vertical remixing, this paper will refer to all of these techniques as different types of "arrangement".

As shown by (Iwamoto, 2017), Vertical arrangement is a technique which involves a single looping piece of music with layers that are faded in and out by the game. Examples of this can be found in *Celeste* (Maddy Makes Games, 2018)

According to Iwamoto, this technique is best applied to what he calls "bidirectional gameplay changes". (Iwamoto, 2017)

These are changes in state that can go flip between each other. The Chocobo is a good example of this; The player can start or stop running at any time, and vertical arrangement allows the music to be emotionally congruent no matter what the player decides to do.

A real-world comparison for this type of system would be the loop pedal, where a performer can add or remove layers of a looping composition on the fly.

Another advantage to this technique is that it can react quickly enough to a player's action that they can associate the feeling of the music with that action.

In *Celeste*, for example, when the player character is submerged in water, the music transitions to its underwater variant. This version of the music, among other things adds a low-pass filter to the mix, a diegetic element that conveys the real-life feeling of being underwater.

Vertical arrangement is also used to reinforce the fictional settings of games. Iwamoto gives the example of a seaside harbour with a restaurant in *Final Fantasy Fifteen*. The entire seaside area has its own theme, but as the player enters the restaurant, a Jazz band joins the mix to reinforce the location, fading out as the player leaves.

Interestingly, in this example the jazz band does not simply fade in as it does in the other two examples. Instead, the system takes note of when the player enters the restaurant and effectively queues the music to start on the next available bar. This emulates a live performance, reinforcing the fiction of the world. He says: “By making the transitions in sync with musical accents, it sounds as if it’s not just crossfading, but instead it gives the impression as if a pianist and a drummer are playing along to your game and are making a musical change.” (Iwamoto, 2017)

Vertical arrangement can also be used to accompany a narrative. An example of this can be found in *Celeste’s* track *Scattered and Lost*, (Raine, 2018) which keeps the same melodic, harmonic, and rhythmic structures but navigates the emotional beats of the story through altering and developing the parts within those structures. Beginning with an air of mystery and discovery, then transforming into anxiety, then finally panic and dread as Mr Oshiro chases the player out of the hotel.

The second established method, as discussed by Iwamoto, is *Horizontal arrangement*, where a distinct musical section is looped until permanent progress is made.

This technique is used primarily to accompany unidirectional progress, where events happen one after the other. Iwamoto gives the example of a boss fight, a fight against a single named opponent with a self-contained narrative arc. In his example, any progress made by the player is permanent (unless the player fails completely, in which case the music restarts with the scene).

(Analysis) The extra degree of predictability afforded to the composers by the unidirectional progress grants the use of certain techniques concepts that are more closely associated with film scoring. As narrative beats happen in a set order (i.e., they’re more *linear*), the any given movement only has to transition to the next movement in the sequence.

In summation, vertical arrangement’s primary role in games is to reinforce changes in the game’s state. It achieves this thanks to its ability to react instantly to gameplay events such that the player can build a mental association. However, due to the fact that all versions of a track must be able to transition into each other, compositions are often limited to variations of a single core structure. It is best suited to non-linear gameplay.

Whereas horizontal arrangement is suited to more linear, narrative-driven parts of games.

Ludic Music

In his thesis *Ludic Music in Video Games*, (Kamp, 2010) examines music as an element of gameplay. The work is focussed on the idea of using music to *play* a game (i.e. complete it). The term *ludic music* was coined by (Val Elferen, 2011) in reference to Juul's "Rules and Fiction" model. While horizontal and vertical arrangement describe methods for arranging music based on gameplay, ludic music functions as a fundamental part of gameplay.

He gives the example of *Guitar Hero* (Harmonix, 2005), stating that the music could be replaced with visual or auditory cues without affecting the gameplay.

Silence and rests

Should a composer need a game's music to both respond instantly and change its harmonic or rhythmic structures, they will often simply end the piece, wait a moment, and then start the next. Simple examples of this can be found in the *Pokémon* series (Game Freak, 1998), where linear musical themes accompany distinct areas. When the player enters a new area, the previous track simply fades out and the next track begins after a brief period.

Although this was born out of the technical limitations of the time, the linearity of the tracks gave composers more creative control over their tracks, arguably contributing to the games' strong musical identity.

Hollow Knight (Team Cherry, 2017) does this too, as entering a new area or boss fight is usually accompanied with a brief rest in the music followed by that area's theme. This indicates that breaking the continuity of a game's music can be used to creative effect.

Applications in Multiplayer Games

There are, however, types of gameplay that are not adequately served by vertical and horizontal arrangement. These are games which are either absent of, or do not rely heavily on their fiction and instead build their engagement entirely through their rules.

(Morasky, 2014) discusses the use of music in the cooperative multiplayer game *Left For Dead*. (Valve, 2008)

Valve experimented with divulging information to the player exclusively through music as a way to get players to engage with it. They had a music theme that played when a certain enemy was alive.

When a bug happened that stopped that particular theme playing, the enemy became much harder to fight because players had less information. This resulted in the studio expanding the system to include sound queues for all the 'special' enemies in the game, among other key pieces of gameplay information such as the start of a new round.

They found that players developed automatic responses to these musical queues, such as taking defensive positions.

Morasky comments: “(Music) works on a pre-conscious level –... it communicates stuff to us on the side of our brain that isn’t linguistic”. (Morasky, 2014)

Posing the idea that music an avenue that can be used to teach players and reinforce their knowledge without them consciously thinking about it.

This links to (이기현, et al., 2018). Here, a study has participants play a rhythm game and measured their brain activity while playing with and without music.

The results showed that while player’s achieved scores were similar in both groups, the music group showed high activity in the primary audio processing cortex of the brain (Brodman areas 41 and 42), while the group that played without music showed high activation in the Broca area, which is associated with language comprehension and syntactic information, playing “a significant role in language comprehension to use syntactic information”. (이기현, et al., 2018)

“It seems the result that uses a cognitive function of the brain instead of musical beats or rhythms to perform without music. The activation of auditory cortex seems a result of the imagined musical rhythm during playing game”. (이기현, et al., 2018)

Essentially, these results indicate that player’s brains process information differently depending on whether that information is communicated musically or non-musically, and that players will use their auditory cortexes to process visual rhythmic stimuli.

An unlikely example of this can be found in competitive fighting games.

A video by musician and fighting game player AkitoBass shows him using his MIDI keyboard as a controller in order to show the inherent musicality in some fighting game play. (AkitoBass, 2020)

The video shows the player executing a *combo* – a series of attacks linked together with precise timing.

Commenting on this, player and creator (Forster, 2021) said that the video demonstrates how “fighting games are also rhythm games”, going on to comment that “it’s hard to communicate to people how rhythm-based fighting games feel... When I perform a combo, I can feel the rhythm”.

Crypt of the Necrodancer (Brace Yourself Games, 2015) was not initially intended to be a rhythm game. Designer Ryan Clark (Clark, 2014) stated in a Q&A that he wanted a fast-paced *Roguelike* but didn’t want to remove the turn-based aspect of the genre. His solution was to require players to take their turns quickly. He writes: “When I did this, it felt kind of like moving to a beat!”, he developed this idea further by playing the game to the beat of *Thriller* by Michael Jackson and loved how the game felt to play. “It felt amazing... *Crypt of the NecroDancer* was born!” (Clark,

2014)

These examples indicate that gameplay itself can have rhythmic qualities, and that in the absence of accompanying music, players will use mental resources to interpret that gameplay rhythmically.

Competitive multiplayer games, such as *Counter-Strike* (Valve, 2000) are notoriously underserved by adaptive music. “Writing music for these online multiplayer games is probably one of the most difficult things you can do”. (Sideways, 2016)

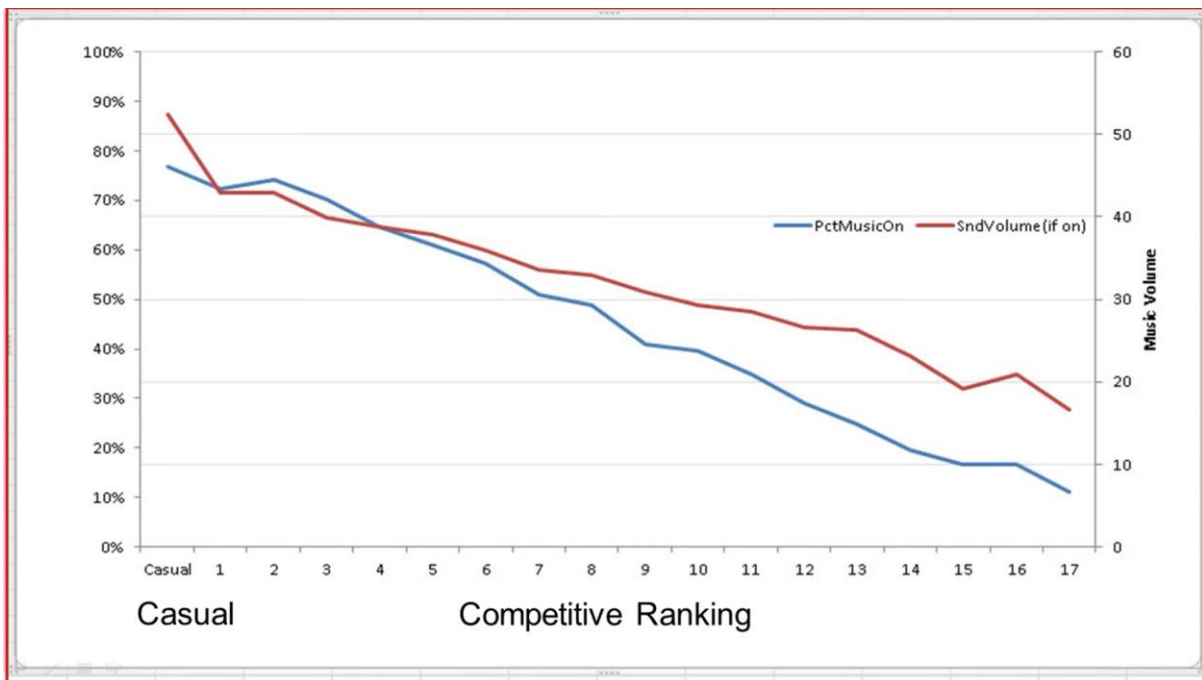
Regarding multiplayer games, Sideways writes “With these newer games that have no offline single-player story, all the music you write has to function around what the players are doing, instead of more rigid queues and checkpoints.” (Sideways, 2016)

(Morasky, 2014) explains some of the major issues inherent to music in multiplayer games.

Firstly, players often play such games for hundreds or thousands of hours which all but guarantees that any repetition will eventually become grating to players.

This graph shows the inverse relationship between a player’s rank and their likelihood to have the in-game music turned on. (See Figure 1)

Figure 1 (Morasky, 2014):



Secondly, any music that responds to gameplay situations necessarily relays gameplay information to players. (Morasky, 2014) gives the example of the *Portal* Series. Originally the team thought about adding music as a puzzle element but chose not to because it inherently

divulged information about the puzzle, robbing the player of their “ah ha” moment. As the player only had to follow the music, rather than engaging with the puzzle.

In a multiplayer game would require players to listen to the music so as not put themselves at a disadvantage. This would almost certainly cause repetitiveness issues for both players and spectators (Morasky, 2014)

Another issue is that music during gameplay can obscure gameplay related sound that the player does want to hear. (Morasky, 2014) gives the example of footsteps – “You really don’t want a lot of music in the game, you need to be able to hear the footsteps.”

Both *Counter-Strike* (Valve, 2000) and *Overwatch* (Entertainment, 2016) attempt to solve this problem with musical queues that score the beginning of a round, timed to end as soon as the main gameplay begins.

They also both use linear music for their respective end-of-round timers. Counterstrike for its 30-second bomb timer and *Overwatch* for the final 30 seconds in a round.

Notable in its absence is any sort of music during the main gameplay. The only exception here is the diegetic musical queues of *Overwatch*’s *Lucio* who, like Final Fantasy’s Chocobo, has a vertically arranged theme to reinforce the two states that he can toggle between at will.

(Juul, 2005) writes “rules themselves create fictions”.

A competitive multiplayer game with a somewhat unique approach to this problem is *Valorant* (Riot Games, 2020).

Upon killing an enemy, the player responsible will hear an e minor orchestral stab. With each subsequent kill, the player will hear a different orchestra hit that climb stepwise through the e minor scale. If the player kills all five members of the opposing team, the orchestra resolves the tension with a melodic statement that resolves back to e minor. Critically, this final statement is the only musical sound of the group that contains rhythmic information. The rest are all single staccato chords.

Analysis

Briefly, the concept of ludic music as music that is central to the rules of a game may be questioned in reference to Juul’s point that a game’s rules create narratives within the player. It is important to understand that the intended experience of a game is usually a culmination of ludic and narrative elements working in tandem.

(Kamp, 2010) gives the example of guitar hero, stating that as the game can be played with the music turned off, its music is not ludic. In reference to Forster’s comments on the inherent musicality of fighting games (Forster, 2021), and the study indicating that the brain perceives

rhythmic gameplay musically even when the music is turned off (이기현, et al., 2018), it seems that players perceive music when playing these types of games even when there is no recorded music being played.

Furthermore, both the rules and fiction of guitar hero are designed to provide the fantasy of mastering an instrument. So, while the game can be played in silence, its intended experience cannot be reached.

Williams' quote identifying the two primary goals of interactive music as "responding to gameplay states" and being "emotionally congruent" with a non-linear narrative (Williams & Lee, 2018) corresponds with the technological conventions of using Vertical and Horizontal arrangement. Vertical arrangements are suited to responding to gameplay states, which horizontal arrangement is more frequently used as an emotional and narrative tool.

It appears that Juul's concept of rules and fiction tracks with the established methods of arranging adaptive and interactive music. The examples listed in this paper indicate a correlation between the linearity of gameplay and the verticality of arrangement.

Games that are more rules-based, such as *Celeste* (Maddy Makes Games, 2018), tend to heavily employ vertical arrangement, whereas more narrative-lead experiences like *Final Fantasy* (Square Enix, 2016) rely more on horizontal arrangement.

Williams' quote identifying the two primary goals of interactive music as "responding to gameplay states" and being "emotionally congruent" with a non-linear narrative Williams (2018) corresponds with the technological conventions of using Vertical and Horizontal arrangement. Vertical arrangements are suited to responding to gameplay states, which horizontal arrangement is more frequently used as an emotional and narrative tool.

This could be a result of the nature of these techniques. Horizontal arrangements are necessarily affected by temporal aspects of play. In order to maintain both its continuity and its rhythmic structure, a horizontal arrangement can only respond to gameplay changes at set rhythmic intervals. As a result, the time taken for the music to respond can vary based on when the given gameplay change occurred relative to the music.

Vertical arrangement seems to suffer the opposite problem. With the ability to transition between 'modes' in a fixed amount of time, rather than at a predefined point in the music, composers can exercise full control over the rhythmic, melodic and timbral elements of their scores. In reference to (Iwamoto, 2017), having these different arrangements transition in a fixed amount of time allows the composer to communicate causality to the player more effectively. *Final Fantasy* does

this with the Chocobo's walk to run transition, whereas *Celeste* and *Portal* (Valve, 2007) use quick transitions to communicate progress in a level.

There are several cases in *Celeste* where, for example, unlocking a door immediately causes a drum track to fade in, reinforcing the significance of the interaction.

A weakness of this approach is that the need to be able to transition in a fixed amount of time at any point necessitates that the tracks have a consistent harmonic structure and time signature. This restricts the composer's ability to change these elements during a piece, limiting the range of emotion that can be expressed by it. While games such as *Celeste* and *Hollow Knight* address this issue with timbral, melodic and rhythmic variation, their main avenue for variation is in modulating the intensity of whatever core emotion the harmony implies.

It's a spectrum

Notably, the games referenced in this paper tend to employ both of these techniques in varying amounts. Furthermore, there appears to be a correlation between the linearity of gameplay and the verticality of arrangement.

Titles such as *Final Fantasy XV* draw much of their appeal from their fiction. While games like *Counter-Strike* use light fictional elements to frame their gameplay, and games like Tetris are completely abstract and devoid of fiction.

Competitive Multiplayer Games

By their nature, versus multiplayer games derive their engagement almost exclusively from a complex set of rules and interactions. As (Juul, 2005) says, these rules themselves create narratives. These narratives take place not in the fictional game world, but in the minds of the players. Every interaction between players generates some sort of story and creates some sort of emotion in the player.

The functionally infinite number of ways in which a fight in *Overwatch* can play out often lead to players experiencing a wide range of intense emotions. Feelings of uncertainty, power, anxiety, frustration, and triumph can be caused by the gameplay alone, often in the span of minutes or even seconds. There could be great untapped potential for composers to accentuate these emotions with interactive music.

So why don't we see much of interactive music in these types of games?

Simply put, the sheer number of variables that contribute to a player's emotional state in a game is too great to effectively score using conventional methods.

In a *Final Fantasy*-style boss fight, the player's progress can be represented by a simple numerical value – the boss' health. Thus, the game can transition either horizontally or vertically depending on that value. In *Overwatch*, however, the likelihood of victory at any given moment is

subject to the actions of twelve human beings, all controlling complex characters who interact with each other in ways that are much harder to represent numerically.

Even if designers could represent the current state of play in a way that would allow these methods to work without unintentionally divulging or obscuring critical gameplay information with music, one could assume that players would still follow the trend identified by Valve (Morasky, 2014) and eventually opt to turn it off.

Valorant's approach offers an interesting solution. By using single chord hits as a sound effect for killing an enemy, the composers are able to musically reinforce the rising tension of engaging one's opponents, and the catharsis of single-handedly taking down an entire team, all without disrupting the gameplay in any way.

This approach seems to necessitate these sounds be completely arrhythmic. Since the amount of time between kills (and therefore between sounds) is completely unpredictable, any rhythmic information inherent to an individual sound risks being contradicted. If a sound implies a tempo of 120bpm, the next sound being triggered at a time that follows that expectation relies on non-musical interaction between players.

Using sounds with harmonic information but no rhythm allows that harmonic information to impart emotion independently of time.

If music is defined as a collection of organised sound, then *Valorant's* individual orchestral kill sounds are not music – they are sound effects that happen to be chords.

They only become music when arranged by the gameplay and as such, their musicality is a function of the gameplay. I shall refer to this concept as 'ludic composition' - Non-musical sounds organised into music by the gameplay. This idea can be used as a framework for understanding existing works and developing new ones.

Other examples of ludic composition include the rhythmic element of fighting games as mentioned previously, or even the original concept of *Crypt of the NecroDancer* (Brace Yourself Games, 2015) where the time limit between turns gave the game a rhythmic quality. Although by this definition, that arrangement ceased to be ludic when music was added to the game as now the music as an accompaniment to the gameplay rather than a function of it.

Notably, the sound that accompanies a player's fifth kill in a round is its own piece of music. It is linear and contains both harmonic and rhythmic information and is therefore not ludically arranged. This works because in normal play, it will always accompany the fifth kill. Since (in almost all cases) it will not be interrupted, the fifth kill sound is free to use rhythm and therefore is musical.

In the rare case that it is interrupted, it can only ever be interrupted by itself, therefore preserving some rhythmic cohesion.

A more basic example of this phenomenon can be found in *Pong* (Alcorn, 1972), while it was previously mentioned that the game had no music it could be argued that it has a ludically arranged soundtrack. With individual notes sounding whenever the ball collides with something, the resulting soundtrack can be argued to be a function of the gameplay itself.

The use of ludic composition could also result in the more complex application of Morasky's idea of using music to teach the player (Morasky, 2014). Many fighting games have subjectively poor new-player experiences, requiring players to learn and internalise complex systems in order to compete effectively. These games often have simple combos that are suited to novice players. As an example, if a fighting game character's punch, kick, and throw sounded ii, V and I chords respectively, successfully executed combo with those moves in that order would result in a musical resolution, subtly reinforcing a player's success, but a failed execution would fail to resolve this tension and a single punch would be non-musical, neither building nor resolving any tension.

This is already commonly done using sound effects, with animations diegetic sounds and vocalisations reinforcing the emotional impact of gameplay. Adding subtle musicality to these systems could increase the range of emotional tools available to designers.

While *Valorant's* orchestral stabs are clearly intended to be interpreted musically, are close enough to what most audiences will associate with music to be registered consciously, and fit within the game's stylised aesthetic, other games may explore more subtle approaches.

For example, functional harmony could be applied to the prominent frequencies and harmonics of sound effects to reinforce the emotional intent of gameplay. A player swinging their sword could have its 'swoosh' sound effect based on a first and fifth harmonic, while that same player's 'swoosh' could be based on a tritone when heard from the perspective of an opponent.

Conclusion

Traditional rhythmic music requires a layer of abstraction in order to be synchronised with arrhythmic gameplay. Outside of rhythm games, the temporal aspects of play (referring to the actions of both the player and the game) can be entirely dependent from any rhythmic structure. As a result, games often decouple the player's actions from the music itself, relying on traditional compositions which are then modified by the game in response to the player.

Due to the both the chaotic nature of multiplayer games, and the amount of time players can spend with them, traditional horizontal and vertical arranging techniques often become repetitive to players. They can also cause issues with the ludic elements of a work by either obscuring

crucial sound effects or disclosing information that is intended to be hidden from players. Because of this, composers and designers tend to avoid music during competitive gameplay despite the opportunity for emotional scoring that it presents.

Ludic composition is one potential solution to this problem, one that could allow designers and composers to employ musical techniques currently underserved portions of the games industry by making music a function of gameplay.

In order to develop this further, experiments could be performed with different applications of this concept. Further studies into the neural activation of different games' players, especially those that are said to have inherent rhythmic elements could give insight into how effective ludic composition is for both teaching and influencing player emotion.

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MODULE ASSIGNMENT COVER SHEET

MATRICULATION NUMBER: 40407472 _____

Please ensure that you have removed your name from your assignment
– don't forget to check both the header and the footer.
Please **do** include your Matriculation Number, though.

MODULE TITLE: Contextual Studies: Research in Music _____

MODULE NUMBER: MUS09159 _____

NAME OF MODULE LEADER: Dave Hook _____

DATE OF SUBMISSION: 17/05/2022 _____

DECLARATION

I agree to work within Edinburgh Napier University's Academic Conduct Regulations¹ which require that any work that I submit is entirely my own². The regulations require me to use appropriate citations and references in order to acknowledge where I have used any materials from any sources.

¹ These form part of the Student Disciplinary Regulations - A useful website on Academic Conduct requirements and how you can ensure that you meet them may be accessed through the Student Portal, via the Plagiarism icon. Please note that breaches of Student Disciplinary Regulations, such as Plagiarism and Collusion, may be investigated and penalised.

I am providing my student Matriculation Number (above) - in place of a signed declaration – in order to comply with Edinburgh Napier University’s assessment procedures.

Title:

Ludic Composition in Video Games

Introduction:

In his book “Half-Real: Video Games between Real Rules and Fictional Worlds”, Game Designer and Theorist Jesper Juul discusses the nature of video games. Stating that: “*A video game is a set of rules as well as a fictional world*” – (Juul, 2005). This paper will explore the various established methods of composing adaptive soundtracks for games, how they relate to the binary framework of “Rules and Fiction” proposed by Juul, and ways the field could develop further.

In line with Juul’s framework, there appear to be two conventional methods of adaptive soundtrack composition.

Music for the fictional world functions similarly to the music of film or theatre. Employing narrative scoring techniques to accentuate character and plot. Music made for the “rules” side of games is essential to the gameplay. This generally describes all rhythm games (where players are challenged to time their inputs to music) but can also apply to music that is used to divulge information about the state of the game.

There are games, however, that do not follow this model. These are games which I will argue do the majority of their storytelling through their rules. This primarily applies to competitive multiplayer games, which pose a unique challenge for composers. Not only do these games rely almost exclusively on their rules (rather than their fictions) to engage their audience, but the relative complexity and longevity of these experiences render the methods traditionally used for scoring single-player games are not suitable here.

Today, primarily gameplay-focussed games such as multiplayer and casual games occupy a large section of the industry. The top seven highest-grossing games of all time range from very little to zero focus on narrative elements (Wikipedia, 2022) Games like these tend to be fairly light on adaptive soundtracks. For example, *Grand Theft Auto V Online* (Rockstar Games, 2013) almost exclusively features diegetic, static music. As the art form progresses, the need for adaptive music

in that niche grows.

Question:

How can adaptive soundtracks support the stories that games tell through their gameplay?
Specifically with regard to competitive multiplayer games.

Resources:

The main literary sources I will examine are as follows:

The “Rules/ Fiction binary” proposed by Juul, J 2005. His book ‘*Half-Real: Video Games Between Real Rules and Fictional Worlds*’ is considered a seminal work in game design theory. There is a fair consensus around Juul’s ideas, and the paper will examine how music is and can be used within this framework.

Following on from this, (Kamp, 2010) examines music as an element of gameplay. The work is focussed on the idea of using music to *play* a game (i.e. complete it). He argues that this excludes rhythm games like *Guitar Hero* from the definition, based on the fact that music is not necessary to play the game.

This paper will argue for the expansion of that definition. To continue the *Guitar Hero* analogy, the game’s core design intent of giving players the sensation of learning and mastering an instrument would be incomplete without its adaptive soundtrack.

On the topic of the rhythm game *Guitar Hero*, (Miller, 2009) argues that the player is both playing music and pretending to play music at the same time. The player is both following the rules and accepting the fiction.

Emotion in Video Game Soundtracking (Williams & Lee, 2018) Provides insight into and analysis of established techniques for composing and arranging for video games, particularly in regard to building and maintaining emotional congruence with a non-linear narrative.

The paper will also reference talks given by industry veterans, including those who worked on *Celeste*, *Final Fantasy XV* and *Counter-Strike* (Valve, 2000)

Methodology

As stated by (Juul, 2005), “Rules themselves create narrative”. This paper will examine adaptive

and interactive music in relation to this statement, as well as the concept of rules vs fiction in general. It will explore established methods for scoring games and why these methods fail when applied to multiplayer games.

For example, the team based multiplayer game *Overwatch* is designed in such a way that team fights follow narrative arcs and produce interesting stories for its players, yet *Overwatch* and many games of its ilk feature almost no music during gameplay. Understanding why may bring insight into ways music can better serve this type of game.

This paper will examine adaptive soundtracks from the perspectives of Musicology, Game Design Theory and Psychology and address whether the Rules/Fiction binary the best way to approach composing for all games.

Understanding of how composers and designers apply music to single-player games may allow for new insights into composing for multiplayer games.

Method

Primary research will consist of close readings of games that use interactive soundtracks successfully. These games include *Celeste* (Maddy Makes Games, 2018) and *Final Fantasy VX* (Square Enix, 2016), which serve as examples of primarily vertical and primarily horizontal arrangement respectively. This will mainly focus on the different use cases for established techniques. Literary works such as that of (Juul, 2005) and (Williams & Lee, 2018) and conference proceedings from established figures within the game music industry will be compared with observations of a selection of games.

Secondary research will draw from various literary sources in the fields of adaptive music and game design theory. The paper will also draw from various professionals in the industry. Particularly those who worked on games I cite.

Summary

I aim to examine approaches to the problem of composing for the player's story and present an alternative framework to the Rules/ Fiction binary in Video Game Music. This paper will argue for the use of '*ludic composition*' as a framework for analysing and creating interactive music in multiplayer games and beyond.

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Timeline:

Proposal - 10/04

Research

- Reading: 17/04
- Close reading and musical analyses: 24/04

Evaluation

- Evaluation: 01/05
- Write up Finished: 17/ 05