

DL838 Creative Music Production Professional Project

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To What Extent Can Audio Assets Be Applied Across Different
Gaming Mediums: Tabletop and 2D Pixel Art Games

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Declaration

I hereby certify that the material, which I now submit for assessment on the programmes of study leading to the award of BA(Hons) in Creative Music Production, is entirely my own work and has not been taken from the work of others except to the extent that such work has been cited and acknowledged within the text of my own work. No portion of the work contained in this thesis has been submitted in support of an application for another degree or qualification to this or any other institution.

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Introduction

The aims of this thesis were to explore to what extent can audio assets be applied across different gaming mediums with specific focus on a 2D pixel art video game and a tabletop roleplaying game, TTRPG. To focus this study, metrics of success were determined following the literature review, before any compositional work was carried out.

Following this section will be the literature review. This will consist of the academic references used to better understand this area of study. It is also within this section that the metrics this thesis will use to measure success will be explained.

Following the literature review is the methodology. This section is dedicated to explaining the practical work that was carried out by the researcher of this thesis. This includes elements of audio composition, game development, audio integration, carrying out playtests of the 2D game and TTRPG along with how data was collected for this thesis.

The analysis covers the most important information that was gathered for each gaming experience along with initial observations of this data. The discussion section that follows will bring this information together in order to draw conclusion and formulate arguments based on the information from the data and comparing it with the theoretical framework established by the literature review.

The conclusion will express final observations along with a summary of the thesis overall.

Literature Review

[Ludomusicology and Non-Linear Music Research](#)

The research topic of this thesis falls under the category of Ludomusicology. This term, first coined by Guillaume Laroche in 2007, was defined as “the union of ludology, (the study of games and their mechanics as a cultural phenomena) and musicology.” by Juan Pablo Fernández-Cortés in their 2021 paper titled “Ludomusicology: Normalizing the Study of Video Game Music.” This paper takes a general approach to explaining the nature of this form of academic study, how it is “... a continuously developing field of investigation which, to date, has received limited consideration in Hispanophone academic circles...”, and various steps that can be taken when undergoing further research.

The most notable elements of Fernández-Cortés’ paper, as it relates to this thesis, are the non-linear nature of games, video games in this specific instance, and how traditional techniques of source study, such as examining a static musical score, could be seen as a less than appropriate approach as it does not take into account players’ interactivity and the influence that has on structural, harmonic or contrapuntal changes to the musical content. The suggestion of “analytical play”, as described by the author, considers the “reactionary” game experience when perusing research in this way. (Fernández-Cortés)

[The Goal of Audio in Games](#)

The aim of all audio in a game is to communicate something to the player. Depending on what the audio source is, affects what it is trying to communicate. When discussing the roles and functions of music in games in their book titled “A Composer’s Guide to Game Music”, Winifred Phillips is quoted as saying “Music is the way in which human beings communicate to each other without employing words or symbols.” The author continues to describe several tasks music can undertake along with its ability to convey emotion.

One such task is putting a player into an “altered state” of mind as to allow them to correctly interpret the game or scenario they are interacting with for more of a cohesive experience overall.(Phillips, Winifred 120) Another described task is music as a “pace setter”. Within this section, the author focuses the discussion on action-oriented games, highlighting their need for a high level of excitement and how music “... should reflect the pacing and energy level of the gameplay.” She continues by saying “music can also serve the dual function of augmenting that sense of pace.”(Phillips and Winifred 128)

For this project, the composition of the music was carried out with these two possible tasks in mind. As the game experiences used for this project were more complex, specifically in how they switch between different scenarios, aiming for more clear communication to the player

when their focus from one form of play should shift to another, for example, moving from exploration to combat was high on the list of priorities.

[Defining Interactivity and Structuring Non-Linear Game Study](#)

As described previously, there is a non-linear nature to games due to the interactive quality they hold. However, an understanding of what is interactivity is necessary should it be the subject of study. In the conclusion of their article titled “Meaningful Play: Performativity, Interactivity and Semiotics in Video Game Music”, the author, Iain Hart, is quoted as saying “An understanding of a video game player’s interactions as performative acts enables a semiotic analysis of video game music that specifically accounts for the medium’s interactive contexts.” It is this interpretation of interactivity as a performative act that the author argues which allows for the analysis of the players actions to be recognised as meaningful expression and, as a result, actively contributing to the generation of musical meaning.

The author describes how the “Two-fold Semiosis” allows for meaning to be derived from the initial composition, or the elements that set the potential meanings prior to player interactivity, semiosis 1, separate from the meanings imbued by the performative act that is interaction by the player, semiosis 2.(Hart) Not only does this approach acknowledge how the music composed for this project wasn’t fixed in place and perceived the same way each listen but also creates a framework for understanding how player interaction may have changed the meaning of the piece.

[Measuring The Degree of Interactivity](#)

Now having interactivity defined for this project as a performative act, this section will further explain how it can be measured. In KC. Collins’ “Playing with Sound: A Theory of Interacting with Sound and Music in Video Games”, the author argues that not all player interactions with game audio are made equal, the more direct a player’s interaction is, the more the audio is perceived as integrated into the gameplay. (Collins, Playing with Sound)

Using this as a measure of player interactivity and applying it to this thesis, there is now a theoretical framework in place for understanding how interactivity may have affected the player’s perception of audio integration with a gaming medium. In theory, as each gaming medium experience changes the players level of interactivity, moving from tabletop to 2D pixel art game, the degree of interactivity with game audio becomes more direct. As a result of this, there should be an increase in the player's perception of audio integration with gameplay. Measuring interactivity in this way changes how it can be discussed from a binary, the audio is or is not interacted with by the player, to a spectrum measuring the degree in which the interactivity is perceived by the player.

Non-Linear Composition Techniques

As established, games are non-linear experiences. As a result of this, music and audio for game should be created with the intention of being interacted with in this way. In KC. Collins' "Game Sound: An Introduction to the History, Theory, and Practice of Video Game Music and Sound Design" the author emphasises the importance of non-linearity in game music and how this is fundamental for composition within this medium. The author is quoted as saying "I use the term nonlinear to refer to the fact that games provide many choices for players to make, and that every gameplay will be different." and later when discussing audio in games they say "It is the fact that players have some control over authorship (playback of audio) that is of particular relevance here." (Collins, Game Sound 4)

With the understanding that, due to the agency granted to a player within gaming mediums and the freedom they have to interact with gameplay elements in a non-static manner, such as sequence of narrative events, the non-linear nature of games should be accompanied with music and audio elements of a similar construction. Collins later describes how variability can be used as a tool for non-linear music composition, stating how variability "... can be more responsive to the player and to the narrative/image." (Collins, Game Sound 147) They list ten approaches to variability in game music, and they are as follows:

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, Game sound 147)

This project implemented some of these approaches as compositional tools for non-linear music composition.

[Criteria for Creating Game Audio and Measuring Their Integration](#)

In the article titled “Audio Influence on Game Atmosphere during Various Game Events”, the authors, Felix Andersen et al., are quoted as saying “There are three kinds of game audio, that is: background music, ambience sounds and sound effects.” They continue to describe the role of each category of sound, with music being responsible for dictating the emotional or tonal quality of a scene, the ambient sounds help create the environment or space in which a scene takes place and sound effects add to player feedback, with examples given including footsteps and doors opening and closing. These categories of sound, as described by the authors, were implemented into this project to help guide the intent behind the shared audio assets as they were created.

The article further describes the overall purpose of audio in games to carry out three tasks, those being, to inform, entertain and immerse.

“... Inform means the audio cue can be used by the gamers to navigate the game. Our brain can interpret these sound stimuli into a distance, direction and dimension. Entertain means the game audio to hold the gamer attention and to give them fun. The sound should be designed be exciting and original. Finally, Immersion means sense an individual experience of being physically located in an environment different from their actual environment. The sound should generally hint at an environment beyond what can be seen and experienced on screen. It performs the functional task to make the scene feel real emotions...” (Andersen et al. 223)

This project made use of these three described tasks as a metric in which the level of success the audio has achieved when discussing the pairing of the audio and gaming medium.

[Genre Based Composition](#)

In their article titled "From Skyrim to Skellige: Fantasy Video Game Music Within a Neo-Mediaevalist Paradigm", the authors, Brendan Lamb & Barnabas Smith, form the argument that audio meaning is carried through a cultural understanding of musical tropes and conventions, not purely based on visual context. This concept supports the idea of exploring the use of shared audio assets across different gaming mediums as, though the visual elements of each gaming experience that were carried out as a part of this thesis differed, the sonic world created by the audio elements, theoretically, remain consistent for the player interacting with it and their perception of said audio.

This paper also discusses the musical techniques used in each game score and how they are used to match the game world and their visuals which “... epitomize nostalgized fantasy representations of the same areas.” with Przyblowicz’s Witcher 3 score aiming for a more traditional folk-oriented approach and Soule’s Skyrim score pulling from Romantic composition. (Lamb and Smith 89) As the decided upon genre for the experiences was fantasy similar stylistically to The Elder Scrolls V: Skyrim, making use of these neo-medieval

compositional techniques described and the cultural conventions associated with them should help build the world of the game experiences. This intent would also support the approach to inform and entertain the player as is a task carried by audio in games as described previously.

[The Collection of Player Data](#)

In the paper “Playtesting for Indie Studios” The authors, Mirzia Babaei et al., state “Playtesting uses a set of techniques and tools to measure and analyze behaviors of players to retrieve information for developers in order to improve the player experience.” Within this paper, the authors apply several information gathering tools to different groups of players interacting with different games to better understand which tools collect the player data most appropriately. When speaking on focus groups, the authors are quoted as saying “... they are less effective at gathering feedback after a playtest. The issue with the focus group is that generally the loudest voice can sway other users into thinking a problem existed when it did not.” This contrasts heavily to how they speak on the effectiveness of interviews, not only for their “ease of deployment” but also, as they state, “It was very easy to get questions from developers regarding what they wanted to ask players, and formulate them into viable interview questions.” (Mirza-Babaei et al. 6)

Methodology

[Music Composition](#)

At the outset of creating the music for this project, the instrumentation was decided in advance. The base of this project relies on folk instrumentation with the aim of evoking the feeling of a neo-medieval genre, while also being compositionally achievable for the timeframe of this project as the necessary instruments were available for use. Folk instrumentation for this project included the following:

- Acoustic guitar, both classical nylon and steel string
- Mandolin
- Bodhrán
- Bass. Traditionally acoustic instruments, such as a double bass fill this role. However, for this project an electric bass was used.

Three of the five scenes, or areas, of these games adhered to this style of instrumentation, those being the tavern, town and combat. The forest and dungeon/temple scenes differ from these areas, however. The following section will explain how and why these, along with other compositional decisions, were made regarding each scene's music as it relates to the purpose of each piece in the games.

[Tavern Music](#)

The tavern music is the first piece interacted with and heard by the player. Its purpose, first and foremost, is to set the scene and expectations for what can be expected in the games. The aims of this piece were to be welcoming, interesting and tone setting while also not being overwhelming and distracting as this is also the area of the game where the player is likely to spend the most amount of time interacting with NPCs, or non-player characters.

The instrumentation of this piece is relatively stripped back, primarily relying on the nylon guitar, bass and bodhrán to create a mid-tempo waltz like rhythm. Along with this is the inclusion of supporting percussion instruments in the form of shakers and clave. In the second section of this piece, the mandolin is introduced playing a melody over the same chord progression as the first section creating more interest and slight variation from section one to two. Keeping the music composition and instrumentation stripped back in this way should allow the piece to be entertaining while the player explores around the area while also becoming a background element that isn't distracting while engaged with NPC dialogue.

[Town Music](#)

The town music, more than any other piece created for this project, acts as a transition from the safety of “home” in the starting scene to exploring the wider world beyond. This area of the game is also one that had the least amount of content for the player to interact with across both games. The purpose of the piece was to communicate the feeling of safety yet encouraging more exploration in the player. The music was also composed with the intent of becoming more of a background element that captured the attention of the player much less than the previous piece and the one to follow.

This piece is much more stripped back in comparison to the tavern music, only consisting of two instruments, the nylon guitar and the bodhrán. This song is composed of two sections, both based on a simple root note bassline and a rhythm played on the bodhrán. The main differences come from the melodies and the inclusion of strummed chords in the second section. In the first section, the melody is a repeating motif played in fifths before ending with two held chords. In the second section, the melody is a slightly more complex line that takes two bars to complete. As this piece was created to be less intrusive than the previous, keeping the elements restricted was essential.

[Forest Music](#)

The forest is the players first interaction with the world outside the safety of the town or tavern. To reflect this shift in environment, the music is also used to reflect a different way of thinking or interacting with the game to the player. The purpose of this piece is to encourage a feeling of exploration and to instil an element of mystery in the player while still retaining a light-hearted feeling emotionally. To achieve this, the reference point, with regards to genre of the music, shifted to a larger, orchestral leaning score.

A three-chord arpeggio played on the piano as the base of this piece. Moving from section to section, the elements included expand and gradually increase in complexity before returning to the solitary piano by the end of the piece. This includes a melody played on the piano that is then played in unison on a glockenspiel. By the time the transition from the second to the third section occurs, pizzicato strings join the composition before being accompanied by held chords played across violin, viola and cello. Another important element of this piece is how it must contrast heavily to what is present in the dungeon/temple music. This is done to more effectively communicate the change in environment to the player. The music of the forest is warm and inviting while the dungeon/temple should feel cold, distant and ominous.

[Dungeon / Temple Music](#)

Narratively, this area is one that is empty while something dangerous, but unknowable, is looming before the character is at all aware of what is coming. It is a space entirely alien to the character. The music is aiming to communicate a feeling of suspense, mystery and that there is something ominous about this location. This was done by leveraging a contrast from the previous scenes to this one by having almost no instruments play.

The piece is constructed from a droning bass, sporadic piano chords with melodic lines lilted over them and a heavy usage of the “Crystallizer” vst effect by Soundtoys. This is a granular echo synthesiser effect that acts as a delay for a signal but reverses the feedback and recycles elements of that feedback into the signal to be processed again. This creates a more chaotic textural element that remains in key with the piece. Keeping the elements of the music so minimal allowed for more experimentation with the atmospheric audio to convey the feeling of the space as emptier and more hollow compared to previously explored scenes.

[Combat Music](#)

The combat music is an interesting case as it lies somewhere between the grandiose nature of the forest music and the folk instrumentation of the tavern and town. The “folk” elements of this piece represent the player character, while elements, such as the vocalisations and the French horn, represent the enemy in these scenes. The somewhat discordant nature of this piece represents the conflict taking place but musically. The aim of this piece is to convey to the player a sense of urgency, danger and a need to act.

The piece opens with a French horn “War Call” with the intention of immediately catching the attention of the player and communication the scene change. This is followed by a fast-paced louder section consisting of a bodhrán, stomps and claps keeping the steady rhythm, a bass and steel string guitar playing root notes in unison and a nylon guitar playing root notes and a melody. The melody is also played on the mandolin and French horn. On top of all these elements is a rhythmic vocalisation consisting of several voices matching the stomps and claps. These elements all come in quite aggressively to shift the scene quickly from the previous to the combat taking place. The second section pulls away the French horn, stomps, claps, vocalisations and changes the melody being played to a less complex one.

[Running The Experiences](#)

[2D Pixel Art Game](#)

The 2D pixel art game needed for this thesis was built using the Unity Game Engine. This was done as the researcher for this thesis had prior experience using Unity and FMod Studio for college projects focused on audio integration. In this project, the 2D pixel art game was

constructed from an empty Unity project, implementing the use of recoloured, pre-made character sprites and tile maps to speed up that element of the game making process. The various systems of the game, such as movement, health tracking and object interactions were built and modified following various tutorials found online, primarily in video form on YouTube.

As mentioned, FMod Studio was the audio middleware used to integrate the audio assets created for this project into the 2D game. The music and atmospheric audio for each scene or area of the game were set up as nested events within a larger event titled "Overworld_Music". As the player's hitbox collides with an audio trigger gameobject, the "Area" parameter in the overworld music event switches to match the appropriate audio to the scene.

Separate from this overworld music event is a "Combat" event. This event was built in a similar way to the other nested events, however, was used as a separate event to ensure the audio of the combat scene would end exactly as the encounter was complete. This contains all music elements composed for the combat encounters of the game.

At various point of the game, sound effects are used as one shot triggers to match interactions occurring in the game, such as picking up a key, unlocking a door and combat sounds. These use 2D Action events which are more simplified than the 2D timeline events used for the musical and atmospheric audio. These action events only require a trigger to start and, upon reaching the end of the event audio, they stop automatically. This is useful for sound effects such as these as it minimises the amount of code needed to integrate them into the game.

In order to run the game for this experience, a laptop with the final build of the game preloaded onto it was provided. Along with this was a pair of headphones to allow the player to better experience the audio. The players who participated in this experience were set up in a quiet space with minimal external distractors, though, they were supervised from a distance to make sure the game ran without any issue. Upon the completion of the game, they each answered an anonymous survey in order to collect the necessary data for this thesis. Discussion about the game they experienced with other participants wasn't permitted until all participants completed the game and survey. This was done to so that each participant would have no prior knowledge of the narrative events or other elements of the game they had yet to experience.

[Tabletop Role Playing Game](#)

Several elements had to be considered when selecting which tabletop roleplaying system would be used for this project. The system needed to be accessible to new players in order to lower the barrier of entry for all potential participants, both those unfamiliar with this genre of game and those with much more experience. The system also needed to share the same elements of the "heroic fantasy" genre that would also be represented in the 2D game

created for this project. It was also essential that the combat mechanics for the system be fast, not only to learn but also to reach the end of combat scenes in a timely manner. These elements combined lead to the use of the Nimble TTRPG which was originally created in order to achieve this style of game.

The game itself was played in the living room of one of the participants. The decision to run the game here was made for a number of reasons, those being the access the players had to the space, more flexibility in relation to start and end times of the experience and more control of the space to ensure external factors effecting the experience could be brought down to a minimum. This allowed for the players to engage in the roleplay elements of the game in a way that may have been hindered in another space.

In order to integrate the audio into the experience, a modified version of the FMOD Studio project created for the 2D game was used for this experience. This was done to ensure the way in which the players interacted with and experienced the audio would be as similar as possible across each game. This was done to reduce the factors that changed across each game other than gaming medium. The FMod project was controlled by the researcher as they also acted as Game Master, or GM, of the experience.

Analysis

2D Pixel Art Game Data

The beginning section of the survey was dedicated to gathering information of each participant. This included interest in gaming, frequency of engaging in the hobby, musical taste outside of gaming and level of interest in this style of game, being a 2D pixel art turn based game. This information was needed in the case of any outliers in the later questions to form an understanding of why there may be noticeable differences in answers. In total there was five participants of the 2D pixel art game.

The second section is where data surrounding the game and the players experience was gathered. The first question asked the player to briefly describe the narrative of the game they had just completed. Primarily, this was a question used to measure how engaged the player was with the game itself as well as seeing what elements of the game left a lasting impact. Three of the five players mentioned the exploration and interactive elements of the game. Two players mentioned the combat involved in the game. Interestingly, one player formed an element of the narrative they experienced that was not intentionally expressed within the game at all. They are quoted as saying “You are a guard who goes off-duty to look into a shady cult”. The interesting element of this, is the assumption that the player is an off-duty guard. During the development of the game, in order to save time, the character sprites used for two of the NPCs were re-coloured versions of the players character sprite. It was not considered what impact this may have on the players experience of the overall narrative; however, this answer begins to explore the impact visuals may have on these experiences.

The next question asked the players how long they felt the experience was while playing. Out of the five participants, only two estimated accurately the length of time playing, this being within fifteen to twenty minutes. The other participants underestimated the amount of time engaged in play at, on average, ten minutes. This suggests a level of altered time perception in a majority of players. What this could indicate is a relatively high level of immersion achieved by this gaming experience.

The players were asked to rank the five areas or scenes of the games from which was best supported by the audio to which was supported the least, in their opinion. The results of this showed that, overall, the forest scene was best supported, with forty per cent of participant placing it first on the list and an additional forty per cent placing it second. When asked the follow up question of why they felt the top ranked scene was the most supported by the audio, one participant answered, “When I was walking through the forest the music was a nice accompaniment in that it made the walk feel peaceful”. Inform the player

The results showed the least supported was the Combat scene, with sixty per cent of participants placing it fifth and bottom of the list. One participant explained how the music of this scene was “very different to the rest of the music” as the reason it was placed so low.

Another said, “The first fight was short so the music was a little jarring with how suddenly it came and went.” Overall, the thoughts on why it was rated so low came down to how distracting the music was and how sudden the shift auditorily this music was from the scenes surrounding it. One participant did place the combat as the scene most supported by the audio provided, however. They are quoted as saying “I thoroughly enjoyed the combat music that’s why I put it so high up. The music emphasises the stress of the moment and got slightly more intense”. The primary takeaway from this feedback, relating to the combat audio, is how for some it was successful at communicating the change in intensity of the scene and shift required in player thinking. The execution, however, with regards to the sudden onset nature of the piece, was lacking.

Participants were asked if there was any section of the game where they were very aware of any looping of the audio. The results showed sixty percent of players agreed with this statement. Of the group who agreed, all stated that it was during the combat scene where they became the most aware of looping audio. One participant said, “it felt repetitive depending on how long the player was in combat.” when answering the of why the scene was least supported. The same player who rated the combat as most supported by the audio stated, “I noticed the combat sounds were looping but I really did not mind it at all, I actually really enjoyed that it was doing so.”

Taking into consideration a separate question that was asked of the players, that being “What section of the game do you feel you spent the most time in?” two participants stated clearly that it was the combat scenes, while another stated “They're all roughly the same”. With this in mind and comparing this information to the question of repeating audio, a potential cause for the noticed repetition could be due to the players being exposed to the combat music more than the other scenes. This in conjunction with the limited number of sections of the audio and the limited ways to interact with the games itself during combat scenes, are elements that likely led to this conclusion.

It is worth noting the feedback received relating to the audio of the other scenes of the game. A participant who placed the tavern as the most supported by the audio said it “Made the setting very clear...”. Other participants stated how the audio provided in the temple and tavern were “appropriate and well executed” along with another calling the audio “very immersive”. This leads to the belief that the audio appropriately informed these players of the mood and atmosphere of these scenes.

[Tabletop Roleplaying Game](#)

As previously stated, the participants of this experience answered a number of questions in a focus group style interview and, similarly to the previous 2D game experience, the participants were asked questions to inform the researcher of music listening habits, experience with TTRPGs and what expectations they have as participants of this game.

When asked the question “What area of the game do you feel was best supported by the audio provided?” it was not very definitive on which way the group as a whole felt. Some immediately expressed how they felt it was the combat scenes, pointing to the energy and contrast of the music compared to the other scenes as the reason why. When discussing the combat music, one player is quoted saying “... the music is indicating towards it [Combat] before you have to as a DM.” This suggests that for some the music for this scene was enough to inform the player of the change in scene and alter their way of thinking to best match the necessary playstyle.

Another player though the tavern music was also effective at communicating information to the player as they said “... I think it immediately put us into the right environment for that” referring to how the opening of the game was more conversation and roleplay heavy. Later they stated “It brought you nicely into the world” showing how it set the mood for the scene that was taking place. This way of phrasing this though also supports the idea of audio as a tool for world building, being able to telegraph to the player a “cultural touchstone” in order to set an immediate expectation for the game they were going to participate in.

One of the players said “it sounded ethereal and kind of like watery like it was almost foreshadowing what was happening later in the game” when discussing the audio for the temple. For this player, the audio was able to support not just the environment but also communicate narrative elements of the game as they were experiencing them. Another player, when discussing the temple audio, said “It felt very fitting for like exploring”.

When asked the question “What area of the game do you feel was least supported by the audio provided?” an interesting answer followed. Due to the short amount of time spent in the town scene, under five minutes, most of the participants had little to no opinion about the audio for this scene, resulting in the feeling that this scene must have been the least supported due to the lack of it being memorable. One player even made note of how, when ranking the audio and how it supported each scene, they didn’t even mention it. Another belief of some in the group of why it wasn’t distinguishable was potentially due to how similar the instrumentation was to the tavern music, blending the two into one experience.

Continuing to answer this question, a number of critiques were received for the combat music. Primarily, how the three combat encounters shared the same audio, which did communicate the change in scene and intensity of the playstyle, though there was nothing distinguishing the encounters from one another withing the audio itself. The players noted how they would have preferred if the combat music reflected the environment of each encounter as well as variations in the music itself to show the differing intensities of each. As it stands the final “Boss Fight” music was the same as fighting the rogue Goblins in the woods. When discussing this a player stated, “Obviously we would know because of time constraints that this is the big boss at the end, but technically nothing is indicating that it's any different to the previous battles.”

In a similar vein to this, the players would have preferred if there were more auditory cues to indicate changes within a scene. Examples of this included the music for the boss fight changing upon the boss reaching a certain level of health or when more enemies were summoned into the encounter. Another example being when the player characters became aware of the chanting within the temple, to actually be able to hear it in the game itself. Elements such as this could have helped improve player immersion as it feels like the environment changes in smaller ways depending on how they interact.

Similarly to the 2D game, when asked if the players noticed any obvious looping of audio, they pointed to the combat. Though, interestingly, some stated how it was more related to people singing along to the piece that would key them into the looping music itself. Those who didn't state this as the reason suggested that the inclusion of vocalisations in the track was the root cause.

Discussion

Similar Findings Across Both Experiences

A majority of those who engaged with these experiences agreed that the combat audio communicated the intensity of the scene itself effectively. This scene was also pointed to by a majority of participants as being best supported by the audio. When players discuss how the music informs of the urgency of the scene this also supports the argument of Winifred Phillips where music functions as a “Pace Setter”. This in conjunction with the audio’s goal of “informing” the player as a metric of success for this thesis, as described by Anderson et. Al., this demonstrates a level of success in the combat audio in doing so.

However, looking further into this, the critiques of this audio are also common across both experiences, most notably the acknowledgement of repeating elements in the audio. In order to mitigate this, following some of the recommendation of the participants in the TTRPG, more variation could be included in the audio itself, this could even be through dynamics as one participant suggested. Following these suggestions would align closely with KC. Collins’ argument for the requirement of variability in audio composition for non-linear games. Though this concept was considered when creating and integrating the audio for these experiences, based on this feedback, it suggests this concept wasn’t implemented enough. Differentiating the combat encounters through the audio could also alleviate the issue of repetition as the players would be exposed to different audio lowering the likelihood of them recognising the loop. Focusing on this is also important as the players felt this was the area of the games they spent the most amount of time engaging with.

Another finding that was similar across the two experiences was the effectiveness of the tavern audio at placing the player into the environment and setting an appropriate mood for the beginning of the games. As, it can be argued that this audio also set expectations for what the player can expect from these experiences, it, theoretically, supports Lamb and Smith’s argument of musical meaning being conveyed through culturally understood tropes. The usage of folk inspired instrumentation helps to establish a recognisable fantasy setting for the player.

A note on the temple audio. The perceived mood set by the audio as experienced by the players who made comment on it was never one of suspense or looming danger as was intended. The feeling that was instilled in the players was one that encouraged exploration, in essence leaning more towards the air of mystery that was also intended from the piece, resulting in the audio being effective in one area, mystery, but not as much in the other, that being a sense of danger. This can be seen as an example of Ian Hart’s concept of a twofold semiosis; showing how an altered interpretation from the composer's original intent emerged through the player’s interaction.

[Differences Across Both Experiences](#)

The participants perception of time while engaged with each experience was a result that differed quite a lot. For the 2D game, the players perception of time passing was more likely to be altered by the interaction with the experience. In the TTRPG however, players were more likely to accurately estimate the amount of time that passes. This is likely due to the fact the players of the TTRPG were required to engage with the experience actively for a much longer time than players of the 2D game. As more energy was spent participating, a player's level of exhaustion could be used as an internal clock informing them of the length of time they played. Along with this, some players had external concerns to the game itself, such as transport following the game, that they actively had to track. As a result, this may be more difficult as a metric to gage the level of immersion a player felt for the TTRPG specifically especially considering how long the game ran for.

One element of these experiences that was quite different also acts as a critique of the audio integration of the TTRPG. A common note received from the players of this experience was the inconsistency of the volume of the audio. Depending on where the participant was seated, they perceived the audio differently as their distance to the speaker wasn't factored into the experience. A result of this was that a majority of the players couldn't hear the atmospheric audio of most scenes, but could, most of the time, hear the music. This meant most of the feedback received was focused on the music of each scene and little to none was dedicated to the atmospheric audio. That being said, some participants preferred a music focused score as when they experience looped atmospheric audio, they tended to find it quite distracting from the game they are playing. However, it must be stated that because of this, the audio experience was quite different from one game to the other. If this playtest was carried out again, more time should be taken by the researcher to ensure optimum listening conditions for all participants involved.

[Expanding The study](#)

There are several areas that this study could be expanded upon. The most obvious is to include more participants in both experiences. The primary benefit of this would be to gain insight from a wider demographic of people. In allowing for more player participation, the potential for having control groups who would experience each game without any audio would also be a possibility. This information would be beneficial for a better understanding the impact the audio's inclusion has on the participant's experience as a whole.

As discussed in a previous section of this thesis, one of the participants of the 2D game was able to draw a narrative conclusion based entirely on the visuals provided. This was an area that fell outside of the scope of this project. However, understanding the relationship between audio/visual and the visual/narrative elements could be beneficial

when constructing audio to be used across gaming mediums. A potential way to bridge this gap, which at one point was a part of this thesis, however, due to time constraints had to be left out and the overall success of this thesis, would be to build an experience, such as an interactive text-based version this narrative, in order to explore what effect the changes in visual elements has on the gameplay experience.

[A Note on The Collection of Player Data](#)

As a result of time constraints, this thesis did implement the use of a focus group as an information gathering tool for the TTRPG experience. Steps were taken to ensure the “loudest voice” wouldn’t sway the group. Primarily, this resulted keeping track of who is speaking, for how long were they speaking and ensuring that anyone who expresses their opinion on a question, explain more than just an agreement with someone else's statement. Should a similar study to this take place in the future, individual interviews would be preferable to ensure each person's opinion is gathered without any external influences.

Conclusion

The purpose of this thesis was to explore the effectiveness of using audio assets across different gaming mediums, specifically focusing on a 2D pixel art video game and a tabletop roleplaying game. In order to examine this area of study, theories of interactivity and non-linear compositional techniques were implemented to understand a player's perception of audio integration within these experiences.

Based on the findings of this thesis it was discovered that audio can be implemented across both mediums successfully should specific measures be taken in the composition and integration of the audio itself. The metrics for measuring success in this project were if the audio provided could inform, entertain and immerse the player while also shaping the player's behaviour in both mediums. When looking to specific examples of success with these criteria, the combat audio is highlighted as it effectively communicated to the player the intensity and urgency of these scenes. Another successful implementation of game audio found in this study was the tavern. This audio was able to not only effectively establish information about the environment but also the setting of the games and set expectations for the narrative to follow.

Though there was success, some shortcomings in the audio production and integration were found. Some felt the combat music was distracting, with specific note to how its sudden nature was jarring for participants of the 2D game along with the lack of variability leading to an increased awareness of repetition. Another area of this study that fell short relates to the integration of audio into the TTRPG. A repeated critique was the inconsistency of volume depending on player positioning in relation to the audio source. As a result of this, the atmospheric audio went largely unheard or commented on by the participants.

There are clear directions for further study in this field. Should this be done, a focus on increased participant numbers would allow for, not only a wider demographic for feedback, but also the potential of having control groups experience each game without the provided audio to further examine what impact its inclusion has on the player experience. Along with this, further research into the impact the change in visuals have on the experience would also be greatly beneficial.

In conclusion, this study can be seen as an exploration into what could be an emerging understanding of cross-medium audio integration within gaming. There is more that can be studied within this field; however, this would require more time and resources to fully understand the requirements of what techniques and theories are necessary to succeed. Although, at the very least, a foundation of what would be needed to apply and adapt audio across different gaming contexts can be found here.

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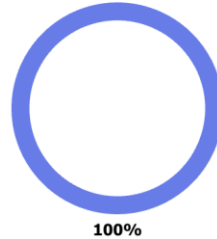
Appendix

Survey Questions And Results

1. Do you consent to the above and wish to proceed with the survey?

[More details](#)

● Yes 5
● No 0



2. Outside of games, be the video games or otherwise, what genres of music do you listen to most frequently?

5 Responses

| ID ↑ | Name | Responses |
|------|-----------|--|
| 1 | anonymous | pop, rock, electronic, rap, new wave, folk |
| 2 | anonymous | Pop, Indie, Midwest Emo, Indie Rock, Folk |
| 3 | anonymous | pop, metal, kpop |
| 4 | anonymous | Soul |
| 5 | anonymous | Synthpop, IDM, Electronica, Indie |

3. Please name the artists that you listen to of the previously listed genres.

5 Responses

| ID ↑ | Name | Responses |
|------|-----------|---|
| 1 | anonymous | audrey hobert, radiohead, chemical brothers, tyler, the creator, talking heads, joni mitchell |
| 2 | anonymous | Chappel Roan, Noah Kahan, The Front Bottoms, Olivia Dean |
| 3 | anonymous | avenged sevenfold, finneas, laufey, fleetwood mac, the cure |
| 4 | anonymous | D'Angelo |
| 5 | anonymous | Aphex Twin, Boards of Canada, Kraftwerk, Beach Fossils, The Strokes |



4. How frequently do you play video games?

5 Responses

| ID ↑ | Name | Responses |
|------|-----------|--------------|
| 1 | anonymous | Occasionally |
| 2 | anonymous | Frequently |
| 3 | anonymous | Occasionally |
| 4 | anonymous | Frequently |
| 5 | anonymous | Frequently |



5. What genre or genres of video game do you seek out the most to play?

5 Responses

| ID ↑ | Name | Responses |
|------|-----------|---|
| 1 | anonymous | farming simulators, life simulator adventure game |
| 2 | anonymous | Platformers, 2D Games, Farming Simulators, Puzzle Games. |
| 3 | anonymous | racing games, adventure and story based, collector games, organisation games, gacha |
| 4 | anonymous | Story Rich |
| 5 | anonymous | Puzzle, RPG, Strategy |



6. Name a few examples of video games you have enjoyed playing of the previous name genres.

5 Responses

| ID ↑ | Name | Responses |
|------|-----------|---|
| 1 | anonymous | stardew valley, animal crossing new horizons, minecraft |
| 2 | anonymous | Stardew Valley, A night in the woods, Hollow knight, A little to the left |
| 3 | anonymous | hatsune miku project sekai, minecraft, mario kart 8, sonic racing crossworlds, gris |
| 4 | anonymous | Red Dead Redemption 2 |
| 5 | anonymous | Deltarune, Undertale, Tetris |



7. Is this style of game, a 2D pixel art fantasy game, one that you would seek out when looking for a something to play?

5 Responses

| ID ↑ | Name | Responses |
|------|-----------|--|
| 1 | anonymous | yes! |
| 2 | anonymous | Sometimes |
| 3 | anonymous | absolutely |
| 4 | anonymous | Yes |
| 5 | anonymous | Yes, this is the style of game that would attract my attention |



8. Briefly describe the narrative of the game you just experienced, including as much detail as you feel is necessary.

5 Responses

| ID ↑ | Name | Responses |
|------|-----------|--|
| 1 | anonymous | the player is acting as an adventurer exploring a fantasy world, on a mission to find treasure. |
| 2 | anonymous | Woke up, was asked to help out with something in a Temple, walked around, found the temple, fought a chest, found the key, killed a god. |
| 3 | anonymous | So I really enjoyed the narrative overall, I was silly and forgot to press E for more dialogue but even with me doing that I still got the story of the game. I enjoyed going from room to room and interacting with different characters. |
| 4 | anonymous | The Player wakes up in a tavern to meet his friend to discuss a quest to slay the Wrought Golem |
| 5 | anonymous | You are a guard who goes off-duty to look into a shady cult |



9. How long do you feel the experience was while playing?

5 Responses

| ID ↑ | Name | Responses |
|------|-----------|-----------------------------------|
| 1 | anonymous | roughly 15-20 minutes |
| 2 | anonymous | 10 mins |
| 3 | anonymous | 10 mins (no idea I was locked in) |
| 4 | anonymous | Short |
| 5 | anonymous | Around 20 mins |



10. What section of the game do you feel you spent the most time in?

5 Responses

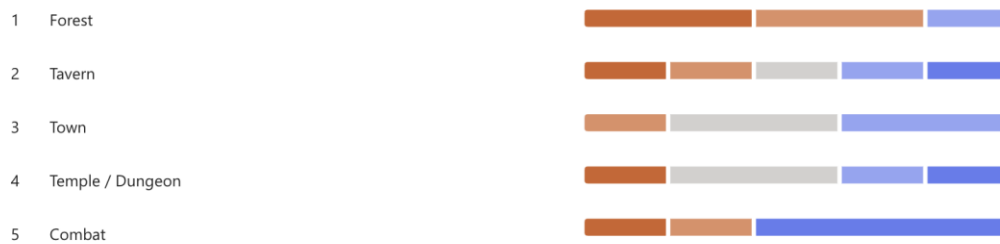
| ID ↑ | Name | Responses |
|------|-----------|------------------------------|
| 1 | anonymous | the boss battle |
| 2 | anonymous | Combat |
| 3 | anonymous | dungeon area |
| 4 | anonymous | They're all roughly the same |
| 5 | anonymous | The town |



11. Rank the following based on how you feel each section of the game was supported by the included audio?

5 Responses

Rank Options



| ID ↑ | Name | 1st | 2nd | 3rd | 4th | 5th |
|------|-----------|------------------|--------|------------------|------------------|------------------|
| 1 | anonymous | Temple / Dungeon | Forest | Tavern | Town | Combat |
| 2 | anonymous | Tavern | Town | Temple / Dungeon | Forest | Combat |
| 3 | anonymous | Combat | Forest | Town | Temple / Dungeon | Tavern |
| 4 | anonymous | Forest | Tavern | Temple / Dungeon | Town | Combat |
| 5 | anonymous | Forest | Combat | Town | Tavern | Temple / Dungeon |



12. Describe what made the previously top ranked section of the game feel best supported by the audio in your opinion.

5 Responses

| ID ↑ | Name | Responses |
|------|-----------|---|
| 1 | anonymous | the music in the temple was very immersive and felt like it suited the location perfectly |
| 2 | anonymous | Made the setting very clear and I really liked how more guitars were added when you entered further into the tavern. |
| 3 | anonymous | I thoroughly enjoyed the combat music that's why I put it so high up. The music emphasises the stress of the moment and got slightly more intense |
| 4 | anonymous | The transition from Town to Forest was smooth and satisfying. The music used for the atmosphere and energy of the Tavern and Temple were appropriate and well executed. |
| 5 | anonymous | When I was walking through the forest the music was a nice accompaniment in that it made the walk feel peaceful |



13. Describe what made the previously bottom ranked section of the game feel least supported by the audio in your opinion.

5 Responses

| ID ↑ | Name | Responses |
|------|-----------|--|
| 1 | anonymous | i was just slightly distracted from the combat because the music was very intense |
| 2 | anonymous | Felt super sudden & there wasn't enough build up into the fight music, very different to the rest of the music |
| 3 | anonymous | I don't fully remember the audio in the tavern and that's why I feel it's not memorable for me |
| 4 | anonymous | Although the music was well created, it felt repetitive depending on how long the player was in combat. |
| 5 | anonymous | The music was good at adding tension |



14. Was there any section of the game where you were very aware of any looping of the audio?

5 Responses

| ID ↑ | Name | Responses |
|------|-----------|-----------|
| 1 | anonymous | Yes |
| 2 | anonymous | No |
| 3 | anonymous | Yes |
| 4 | anonymous | Yes |
| 5 | anonymous | No |



15. What section of the game were you most aware of the looping audio and what elements were you noticing that keyed you into the looping?

3 Responses

| ID ↑ | Name | Responses |
|------|-----------|---|
| 1 | anonymous | combat, because i spent so long trying to beat the boss |
| 2 | anonymous | I noticed the combat sounds were looping but I really did not mind it at all, I actually really enjoyed that it was doing so. |
| 3 | anonymous | The combat |



16. If you have any other thoughts to share about the audio of this game that have not been touched on in previous questions, please include them below.

2 Responses

| ID ↑ | Name | Responses |
|------|-----------|---|
| 1 | anonymous | I liked the sound affect when you changed scenes, the walking sound affect got a little repetitive. The first fight was short so the music was a little jarring with how suddenly it came and went. |
| 2 | anonymous | Very catchy and atmospheric |