Synthesis of Human-Computer Interaction and Mobile Application Development
(Technical Topic)

How does background music (and other sounds) influence a player's gaming experience and emotional engagement in gameplay?
(STS Topic)

A Thesis Prospectus

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction

Imagine playing the survival horror game *Outlast* without any of the accompanying sound – no building crescendos into horrific screeches during jumpscares, no ominous advancing footsteps, loud banging, or garbled mumbling, nothing but the first-person point of view through a video camera. These auditory elements aren't simply background noise, these are purposeful signals designed to pull players deeper into the game, amplifying every decision and making every challenge more personal. For horror games, the strategic usage of sound is meant to heighten players' sense of vulnerability and fear throughout the game. The music and sounds heard during the game aren't just part of the soundtrack – they're emotional partners, magnifying the emotional engagement with the game. Many praises and accolades go out to both musical soundtracks and video games alike, though the union of both is often unsung. Exploring how music and video games tie into each other is interesting, even exciting. Gaming soundtracks, in-game music, loading screen music, any form of music playing throughout a game, it's going to be noticeable for a player, and my STS topic will explore that connection. Developers need to consciously be thinking about what elements will hit the most with their audience, which connects well with my technical topic: the synthesis of the Mobile Application Development and Human-Computer Interaction courses at UVA. These topics have considerable overlap, most notably that both topics highlight the key importance of user experience, human involvement, and engagement. They both rely on personal experiences, genuine feedback and reception, and emotional impacts, all of which are prioritized during development to ensure that the user is engaged and able to have an enjoyable experience with the game or app. Both topics focus on not just having a functional product, but expanding upon that in making it a memorable and meaningful experience. This paper seeks to answer a central question: How does background

music influence a player's gaming experience and emotional engagement in game play? This question is important since it touches beyond just game design practices by opening up a new perspective into how interactive media can create deeper, more personal experiences for users.

Technical Topic

The Human-Computer Interaction course at the University of Virginia teaches students about the key elements to user-centered design in creating both technical and consumer products. This class focused on concepts like user and task analysis – what are the needs of the user, and what tasks do they want to accomplish; conceptual models and interface metaphors – what is the ideal model of this system, what elements can make it intuitive and straightforward for a user; the four phases of iterative interactive design: Discover, Design, Develop, Deliver; and the physical design of software user-interfaces like windows, menus, buttons, and commands. Throughout the semester, students are tasked with designing or redesigning a user interface by utilizing the varying methods and principles discussed in class, overall exploring all components of the design lifecycle: Discovery, Interpretation, Ideation, Prototyping, and Evaluation and Evolution. Mobile Application Development, on the other hand, focuses on designing and building apps for mobile devices that are intuitive, enjoyable, and useful for users. This course focuses on topics like mobile device architecture, programming languages, software engineering, user interface design, and app distribution with the overall goal for students to understand the software engineering concepts, technology, and platforms for mobile development and the privacy, ethical, and usability concerns involved with mobile development. Several HCI concepts can enhance the app development process like feedback, which is crucial in a design as it provides clear responses to user actions – if a user clicks a button, there should be an expected,

correct system reaction to the user's action with minimal, or no delay. Designing *for* people will provide more meaningful and enjoyable experiences, creating a stronger connection between the tech and the people who use it.

By implementing a mobile app-specific user interface to design for the HCI semester-long project, it'd allow these HCI principles to be even further utilized in an actual usable device with improved analysis, design, and testing methods employed to create it. Currently, the HCI project is more of a *proposal* of sorts and doesn't hone in on any coding, so in combining the app development aspect, a more concrete product can come to fruition, and each step of the HCD process can be better visualized and experienced to make the final product more engaging and meaningful for users. For many, it's easier to absorb content and see results live, in-person rather than reading words on a paper. In intertwining concepts from these two courses, the HCI course could be enhanced and refined through the proposal of utilizing mobile app development tools and skills when designing a user interface for the semester-wide project. The existing prototype can be more fully realized than an ideal remodeling of a site, and instead a fully-fleshed out functioning application can be designed. Adding this can better aid students in mastering the HCI concepts learned through real-world practice, and in turn, would allow students to see the ease and benefits of app development when applying HCI design and evaluation methods.

STS Topic

Video game score soundtracks have always taken the player experience in mind, some even going on to win awards or nominations for how immersive or impactful they are such as *Assassin's Creed Valhalla: Dawn of Ragnarok*. In 2023, the composer, Stephanie Economou was

the first ever GRAMMY winner for the “Best Score Soundtrack for Video Games” category. GRAMMYs writer Morgan Enos goes on to detail how her soundtrack is beyond just high-quality – it’s “immersive, evocative, and boundary-pushing”. She makes use of a variety of instruments, taking inspiration from Nordic folk and black metal to elevate to RPG, making it more transformative (Enos, 2023). Similarly, in *Minecraft*, certain tracks play depending on which areas of the game you’re in. The track *Aria Math* is only played organically when in Creative Mode, reason being that “aria” relates to the air and Creative Mode allows the player to fly freely when building. It’s smaller details like these that support how purposeful sound selection is when designing games. Besides physical interaction between the player and the game, the auditory interactions are equally as important. Music enhances games whether in the background or in response to player movements. Cognitive immersion is enhanced from game music and promotes player involvement, similar to how the cocktail party effect works in perceiving a multitude of sounds while filtering out certain “distractors” to focus on a particular sound (Munday, 2007). Similar to film scores, video games leverage certain sounds and musical elements to make the player feel and experience an expected emotion.

The combination of these two forms of media has been increasingly popular, bringing on new understandings of each of them; there’s even a term that defines the study of video game music: ludomusicology, which highlights how video game music is more complex than the existing traditional component interactions of individual, audience, and the musical work due to its adaptive and interactive qualities, emphasizing game music as a dynamic event rather than a static composition (Van Elferen, 2020). One university, Rose-Hulman IT, invited musician Clare Longendyke to one of their ludomusicology sessions to have her perform classic video game tracks to an audience who isn’t very musically-inclined. In surveying the class, she was able to

draw multiple connections between the class's favorite games and her favorite composers, even encouraging them to listen on their own if they liked those pieces so much (RHIT, 2014). Even the pandemic had its impact on the music industry, shutting down live, in-person concerts, so some artists decided to dip into the gaming world. Stars like Ariana Grande and Travis Scott, both with massive followings, made debuts in *Fortnite*, highlighting the importance of a virtual experience, blending the gaming environment with music. The popular game *League of Legends* is the highest-ranked video game artist on *Spotify.* Riot Games, developing company of League, contends that the music they create for the game is made to "draw a deeper connection with a character" (Arevalo, 2023). League's champion themes take heavy inspiration from the characters themselves; the champion Evelynn's theme music is a very unsettling and ominous sound that mirrors the sinister, demonic nature of the character, even incorporating her in-game laugh, reinforcing that eerie experience. The auditory decisions affect gameplay while also adding more depth to characters and world-building, further showing how these are purposeful choices that are both functional and cosmetic.

At Brunel University London, Dr. Brent Ferguson, lecturer of Game Sounds and Music, shared a story from his childhood being obsessed with the game "Chrono Trigger" and immediately stopping his own gameplay when his character loaded into the digital world and a melodic composition began playing. He reports having sat there for an hour, completely mesmerized (Ferguson, 2024). It's that instantaneous attention shift, the immediate fascination with a musical component that immerses players deeper into the game. It can't be denied that the music supposedly meant as background noise plays a more crucial role for players, working in tandem with the visual components to create an engaging, impactful experience. The impact of music on games goes beyond just the digital screen. For a little over a decade, a European

conference for video game music and sound has been celebrated, the most recent of which being Ludo2024 held earlier in the summer as the 13th annual conference, with focus on “Sound, Music, and Space” (Fritsch, 2024). Just recently, they’ve announced dates for the upcoming summer’s conference to be held in mid-July in East London. Overall, the popularity of ludomusicology has grown significantly over the past years, highlighting how music in games has made an impact in both the gaming industry and culturally, being integrated into live entertainment and global conferences.

Despite the growing recognition of game music’s impacts, it’s still left unanswered the effects on players’ emotional engagement, *how* exactly are these musical elements impacting players. This gap leads into the research question I’ll be exploring: How does background music influence a player's gaming experience and emotional engagement in game play? To explore this question, I’ll primarily be relying on meta analysis, secondary interviews, and discourse analysis. For meta analysis, I’ll be compiling all the articles I’ve researched and sifting through them to find the overlapping themes and key concepts to draw more solid conclusions towards my research question. If, for example, there are certain elements and strategies taken in composing video game soundtracks that are commonly used by different composers for different games, then that’s something worth noting. For secondary interview analysis, I’m going to mainly source interviews with the composers and musicians of varying game soundtracks, gathering insights from the creators themselves about their processes for making captivating audio elements. I want to know if there’s a common “recipe” to designing soundtracks that’s used all-around amongst different creators, or if it’s more dependent on the individual creator and their own game. Finally, I’ll look towards discourse analysis of varying online platforms like game developer blogs, game reviews, Reddit threads, and the like to see what real people are saying in

real time, collecting feedback from the players and developers themselves. More often than not, people who play games are truly passionate about the game they're playing and are more than willing to volunteer feedback and insightful commentary about their personal experiences with the game, and I believe that real-world testimony is impactful. Through these methods, I aim to provide a deeper understanding of the ways background music shapes emotional engagement and immersion in gaming. Understanding these effects can offer insights into the gaming industry and address broader implications of sound in interactive media environments.

Conclusion

This prospectus is meant to highlight the importance of player and user feedback when it comes to developing technology. App and game developers need to put the user at the forefront of their design process whether it's through following interactive design principles to make products intuitive and easy to follow or curating specific audio to evoke a certain reaction during gameplay. Video game music isn't just an ambient addition, it's integral to the experience and understanding how it interplays with interactive environments and the effects it can have on players is important in informing developers and composers to design more engaging, captivating works that elevate the gaming experience and resonate deeper with players.

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