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Video Game Sound as Educational Space

Leonard A. Grasso

A thesis submitted to the Graduate Faculty of

JAMES MADISON UNIVERSITY

In

Partial Fulfillment of the Requirements

for the degree of

Master of Music

School of Music

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DEDICATION

I dedicate this document to the students from my first teaching job

It was an honor to know all of you, and I just wish it could have been longer. The idea for this research came to me when I was your teacher. You likely have forgotten me, but I won't ever forget you.

A C K N O W L E D G E M E N T S

In 1987, an old man NPC told Link, “It’s dangerous to go alone. Here, take this.” and gave him a sword. The following people have all given me metaphorical swords along the way, and I want to properly acknowledge them here.

I would like to thank my committee, Will Dabback, Bryce Hayes, and Brian Cockburn for their feedback and support in the forming of this document. Your consistent and reliable assistance was invaluable to me throughout the process.

I would also like to thank the music education faculty at JMU past and present: Gary Ritcher, Lisa Maynard, Jesse Rathgeber, Bryce Hayes, Dave Stringham, Amy Lewis, and Will Dabback in particular, who advised me on this document and countless other projects and endeavors. Thank you all for making me into the music educator I am today and giving me a second chance when I truly thought my career was over.

A hearty and earnest thank you to my two sisters, Katie and Julianne, who introduced me to games and music before I could even read. Everything I have done, you two did it first and made it possible for me. For that, I am eternally grateful.

To my husband, Kley: thank you for being my true partner in life. Your support made it possible for me to use those countless late nights to write. None of this would have happened without you.

And lastly, to my parents, to whom I owe everything: You deserve a whole page to yourselves, but they only let me have one! So, I’ll just say - thank you for it all.

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ABSTRACT

Synergizing fields such as music theory, computing, musicology, cognition, and psychology, scholars and practitioners have approached game music from many directions. However, research on pedagogical usages of game music is still emerging. While many education scholars have researched game-based-learning (Bourgonjon et al, 2013; Simões, Redondo, & Vilas, 2013; Beavis, Muspratt, & Thompson, 2015; Hamari et al, 2016), music education authors have largely remained distant from ludomusicology (the study of music as it relates to play). I intend to bridge that gap by examining the intersections of game music and sound, player interaction, and learning. My research synthesizes the work of Naxer (2020) and Grasso (2020), as the latter has studied affective player experience regarding music and the former has considered the pedagogical implications of game elements in a music learning environment. The purpose of this phenomenological study was to explore experiences related to learning and sound in video games. I sought to answer the following research questions: How do players construct meaning from game sound? What are the educational spaces created by the interaction of game sound and players? Participants (N = 9) engaged in a virtual focus group interview designed around the popular model of Twitch streaming, as well as subsequent individual virtual interviews. I used an iterative coding process to analyze interview transcripts and Zoom chat text, through which themes of kinesonarity and affect emerged.

CHAPTER ONE

Loading...

My name is Lucie, and when I was a child, my absolute favorite thing in the whole world to do was play video games, especially the ones with lots of dialogue boxes like this one, because they tell a story! My mom wouldn't let me take my Game Boy Color to school with me, so when I was at school I would pretend that I was in a video game myself. Instead of Lucie, I was the Hero with a +1 greatsword (my pencil) and a powerful spell book (my trapper keeper). It made me feel powerful and strong!

In the fictional opening vignette, Lucie reminisces about her childhood experiences in school, and how she contextualized those experiences through the lens of a video game: doing her homework the night before school, getting on the school bus, going to math class, and summer vacation become world-building, forming her adventuring party, going through a dungeon to slay a dragon, and ultimately side-quests and potential sequels. The research within this document will reverse Lucie's process, taking experiences of video game sound interaction/perception and framing them as learning experiences, as Gee might have done in his 2003 book "What Video Games Have to Teach Us About Learning and Literacy" if he added a chapter on game sound.

From humble beginnings in the 1970s to a multimillion-dollar industry today, video games have captured the hearts and minds of millions of people all over the world. Mark Wolf, in his 2008 book *The Video Game Explosion: a history from PONG to Playstation and beyond*, offers a definition for video games as games in which the player(s) "face computer-controlled opponents and situations." The use of the word "video" suggests the necessity of a visual element that is provided by an electronic device of some sort. Wolf acknowledges the widespread use of both "video game" as two words

(“video” classifying “game”, much like board game) and “videogame” as one word (consistent with the nomenclature of video software such as “videotape” and “videodisk”). For the purposes of emphasizing the “game” in video games, I will use the two-word version going forward.

Those who play video games range from the parent who plays 20 minutes to unwind before bed to the streamer who makes a living off of playing games for online spectators, and those in between. These players leave their ordinary lives behind and enter the “magic circle” of play (Huizinga, 1938/1955), in which they become someone else, whether that be a valiant hero off to slay a dragon or a simulation of someone else’s day-to-day life. Whatever their choice of game, when players enter the magic circle, they enter a space with new rules, new affordances, and new affective stimuli (Stenros, 2014).

The origin of the magic circle as a facet of play independent of video games can be traced to Dutch historian Johan Huizinga in his book, *Homo Ludens* (1938/1955), who references the magic circle as one of many “forbidden spots, isolated, hedged round, hallowed, within which special rules obtain” of play. Salen & Zimmerman (2004) have since adapted the magic circle from its linguistic roots in Huizinga to its current accepted use within game studies: a border that delimits an instance of playing. While some contest a clear boundary between play and non-play (Malaby, 2006; Taylor, 2007; Consalvo, 2009), scholars of play still widely use the term “magic circle” to describe this boundary (Stenros, 2014), and the nature of video game play as computer-mediated (Wolf, 2008) lends itself to clearer distinction than the play of children on a playground.

Game worlds within the magic circle have rules of gameplay (e.g., they can and can’t do, what they need to do to progress through the game, how to use the controller to

perform certain actions) as well as a unique affect (the mood created by a combination of narrative, visual, and aural styles) that welcome the player into their world. Wolf (2008) considers games as containing “computer-controlled” obstacles, which suggests a measure of agency in elements of games (e.g. visuals, artificial intelligence, story, sound) in the player experience. Gee (2003) asserts that players co-create the game world with the designer. However, the participants in this study rarely referred to game designers when discussing their experiences: instead referencing the games themselves as the co-doers, i.e., co-agents in gameplay. Grasso (2020, p. 41) asserts that players “outsource” processes of knowing from the confines of the corporeal body, accounting for a “diversity of physical and mental subjectivities that frame player encounters with an environment”. Environmental encounters as understood here include procedurally learning contextual rules and building expectations for what the *game* might do (not only in mediating player input to control an avatar, but also in how “computer-controlled opponents” behave). Inside the magic circle of video game play, players are just one of the world’s many agents of change.

In video games, one of the more important agents of both gameplay and affect is sound. Collins (2013) broadly considers all of the sounds that a player may hear and experience while playing a game, including music. A well-composed musical score may elevate an emotional story moment, while a well-engineered set of sound effects may reinforce positive/skilled behaviors within the gameplay and communicate concepts and ideas that visuals may not, such as texture, feel, and ambience. In her 2013 book, *Playing with Sound*, Collins examines the ways players “play” with sound, pulling from the fields of film studies, psychology, computer science, and interactivity theory. She sets game

sound apart from other sound mediums by its inherent interactivity: Players trigger coded game sound in all of its forms through their actions. While people may listen *to* other musics, they interact *with* game music. Thus, players of video games often form nostalgic, often emotional bonds with specific game sounds, as they are more responsible for enacting the sounds in a video game than they may be as audience members at an orchestra concert, music festival, or the showing of a film. This direct participation encourages players to explicitly combine sound and action, in a process Collins calls “kinesonic synchresis.” Derived from the Latin “kine-” (action) and “-sonic” (sound), kinesonic synchresis guided the data analysis of this research as a theoretical framework, contextualizing participant experiences regarding the relationship between sound and their own actions while playing video games.

While sound in all of its forms has both affective and ludic (gameplay) power within a video game, the same is not true for a classroom, which may be dominated by a model of direct information transmission rather than learning through exploration and play (Squire, 2008). What could the sound have been like in Lucie’s pretend school video game? What sound effects might have punctuated her accomplishment of tasks? What music would have underscored her attempts to score a goal in P.E.? In music class, where there is sound by definition, would she engage with music in the way that she did at home: by enacting it in a video game?

Current music education practices in the United States vary widely from school to school, district to district, and state to state, but several paradigms dominate the landscape. At the secondary and upper-elementary levels, a music program often comprises large ensembles such as a choir, band, and orchestra (Elpus & Abril, 2019).

Adults who participated in these large ensembles in high school or college often participate in community ensembles or church choirs in an effort to continue this modality of musicking (Bowles, 1990; Langston & Barrett, 2008; Mantie, 2012). Before students begin large-ensemble participation, many elementary school music teachers focus on full-group activities such as singing, moving, and playing. Since the music teacher/student ratio in a school is often quite high, logistics and supervision issues represent barriers to more individualized instruction that may include students pursuing individual musical interests in the classroom (Salvador, 2018)

According to the National Association for Music Education (NAfME), American students should engage in four strands of activity when they enter the music classroom—Perform, Create, Respond, and Connect. However, many music teachers feel unequipped with the resources and/or training to address all four of those strands, and many focus most of their attention on the Perform strand, specifically within classes that utilize ensemble performance paradigms.

In this research, I sought to explore the potential of sound as it exists in video games to transform music classrooms into vibrant and robust magic circles where all students are welcomed into the music world. The purpose of this phenomenological research study was to explore participants' experiences with learning through sound in video games. Two research questions guided this inquiry:

- 1) How do players construct meaning from game sound? and
- 2) What are the education spaces created by the interaction of game sound and players?

POSITIONALITY/LIMITATIONS

This research began as a marriage of my professional field (music education) and my main hobby (video games). It was thus crafted from my perspectives as a musician, a music teacher, and a gamer; the initial research design reflects a knowledge and familiarity with the sound from a limited number of video game genres. For instance, in the focus group interview, participants listened and responded to tracks that I selected from my own experience that I felt represented a wide array of game genres and musical styles. I was limited in scope by my own experience. However, despite this ignorance, participants unimpededly reported on experiences in the genres with which I was unfamiliar. In fact, I more easily generated follow-up questions when participants were talking about games that were unfamiliar to me, since I often needed more information to contextualize their thoughts.

My prior familiarity with the work of Collins gave rise to one of the two theoretic frameworks that guided the research analysis and discussion: kinesonic synchresis (the other being the magic circle discussed earlier in this chapter). While the interview questions were not geared towards this framework, it very quickly emerged as a dominant theme in the analysis. Participants offered a multitude of perspectives and experiences regarding the relationship between their actions as a player and the sounds occurring in the game. While kinesonic synchresis was not the only category, the framework assisted me in making initial sense of the research data, and became the basis for one of the two overarching themes.

DEFINITION OF TERMS

What follows are brief definitions of common video game terminology that may be helpful to a reader who is not familiar with some of the conventions mentioned in ensuing chapters.

- **Avatar:** An in-game element that is controlled by the player, usually the protagonist or main character.
- **Boss:** A character or creature that the player must fight at the end of a dungeon or overall sequence of challenges.
- **Chiptune:** A genre of music that heavily uses the square, triangle, and noise tracks that comprised the sound of games on the *Nintendo Entertainment System*.
- **Console:** a device that renders game disks or cartridges. Examples include the *Nintendo Gamecube*, *Xbox One*, *PlayStation*, and many PCs.
- **Controller:** The device physically used by the player to play the game. Controllers vary by console, and are sometimes modular (e.g., some games on the *Nintendo Wii* console could be played with various attachments to the main controller to customize the game experience).
- **Dungeon:** A locale within a game that is usually dangerous, obstacle-ridden, and may contain treasure or reward.
- **First-Person Shooter:** a genre of video game in which players utilize modern military weaponry to engage others in combat, such as *Fortnite*, *Call of Duty*, and *Halo*.
- **Ludomusicology:** The study of music within play, often focused on video game music and sound (Kamp, Summers, & Fritsch, 2016).

- **Platformer:** A genre of video game popularized by the *Super Mario Bros.* franchise. Gameplay involves navigating various physical obstacles in 2D and 3D environments, often including jumping on platforms with precision to avoid falling.
- **Rhythm Game:** A genre of video game in which precise rhythmic player input comprises much of the gameplay. Examples include *Guitar Hero*, *Elite Beat Agents*, and *Donkey Konga*.
- **Role-Playing Game:** a genre of video game in which players either create their own characters or inhabit pre-determined characters and participate in their story, modeled after table-top games such as *Dungeons and Dragons*. Often, these games take place in fantasy settings. Examples include the *Final Fantasy* series, the *Dragon Age* series, and the *Mass Effect* series.
- **Title Screen:** Often the first screen that appears when a game is initiated, usually displaying the title of the game in an aesthetic that matches the rest of the game's art style.
- **Town:** a locale within a game that often affords players reprieve from obstacles, enemies, and danger. Towns may be populated by non-player characters that may offer advice, help, side-quests, or simply dialogue.

In the following chapters, I report on my phenomenological research study as an exploration of learning within video games through sound. Before each chapter, I offer a fictional vignette of memories from Lucie regarding how she contextualized the various elements of her schooling as video game elements. While these memories are fictional and loosely based on my own experiences as a child, they invite us to consider some of

the classic elements of qualitative research studies as standard video game elements: two paradigms that might seem disparate otherwise. This chapter, entitled “Loading...” introduced the paper as if a game disk or cartridge was loading onto a console. Chapter 2, “The Lore” functions as a review of relevant literature to set the stage for the document, much like the lore of a video game sets the stage for the events therein. Chapter 3, “The Adventuring Party”, is a report on the methodology and the participants of the study, fashioned after the role-playing game (RPG) convention of a party of adventurers complementing and helping one another to complete their quest. Chapter 4, “The Campaign”, contains a report of data and the analysis, much like a campaign is a report of the main story of a game. In the final chapter, “Side-Quests and Sequels,” I discuss broader implications for the fields of music education and ludomusicology, as well as suggestions for future research.

CHAPTER TWO

The Lore; Review of Literature

I always made sure I did my homework the night before a school day. Otherwise, I would go to school and not know what was going on. Sometimes, you need that background information to put what you're doing into context. My least favorite video games are always the ones that don't actually set up their stories with any world-building or lore! Why do I care about this world I know nothing about?

While “game world” may refer to a structural facet of video games as differentiated from “reality,” the “world” may also refer to the setting of the narrative or story. The literary concept of a setting is certainly not new (Lodge, 1992); video games must introduce players into their world in a way that encourages immediate engagement and investment. Video game lore, as in literature and film, is the information about the world that is not directly related to the current events of the story or actions of the player, but may set the stage for the events to come. Functionally, the literature review of the research study acts as the lore of the world; setting the stage for us to meet our characters in Chapter Three and embark on our campaign in Chapter Four.

Players first found video games in arcades in 1971 (Wolf, 2007) and the first commercially available video game home console, the Magnavox Odyssey, became available in 1972 (Baer, 2005). Since then, the video game industry has grown into a thriving market with all manner of studios, companies, and individuals creating games for PCs, home game consoles, and personal mobile devices. News outlets such as Polygon and IGN devote all or most of their efforts toward video game news, information, and updates. Furthermore, scholarship about games and their industry has emerged as a new

field of research, touching on the fields of psychology (Takeuchi, Mori, Suzukamo, & Izumi, 2017) and computing (Grimshaw, 2014).

A number of scholars have worked at the intersections of gaming, education, music, and music education. Researchers have demonstrated enthusiasm looking at the incorporation of video games into formal classrooms in recent years. In their 2015 study, Beavis, Muspratt & Thompson surveyed students aged 9-14 across six different schools in Australia (N = 270) regarding their perceptions and opinions on game-based learning (GBL). Students reported *Minecraft*, a mining/building simulator game, and *Call of Duty*, a first-person shooter game, as the two games they enjoyed the most. The contrast between the two titles reflects a diversity of experiences students enjoyed and valued. Despite this variety, students grew frustrated and/or bored with games that were not challenging or that were too overtly educational.

Other scholars have studied flow and immersion as they relate to video games. Hamari, Shernoff, Rowe, Coller, Asbell-Clark, & Edwards (2016) investigate flow, engagement, and immersion via the research questions: 1) Do challenge and skills predict engagement and immersion in game-based learning? 2) Do engagement and immersion predict perceived learning in game-based learning? 3) How do engagement and immersion mediate the effect of challenge and skills on perceived learning in game-based learning? Participants included high school physics students (n = 134) playing a physics-based game called *Quantum Spectre*, and college mechanical engineering students (n = 40) playing a game called *Spumone*. The authors found that conditions for flow and engagement had a positive association with learning. However, while immersion was

positively correlated with game performance, it did not have a significant effect on learning.

Squire (2008) uses a comparative case study to build a framework for game-based learning (GBL). He built the research around the following three questions: 1) What new models of learning and training are emerging? 2) What kinds of institutional changes are accompanying this change? 3) What implications does game-based learning present for instructional designers and performance technologists? Following the data collection of three game companies working in different capacities of GBL, Squire presents the following framework to conceptualize GBL going forward: Game designers must (1) create emotionally compelling contexts for learning; (2) situate learners in complex information management and decision-making situations where facts and knowledge are drawn on for the purpose of doing; (3) construct challenges that confront and build on users' preexisting beliefs; (4) construct challenges that lead to productive future understandings; (5) anticipate the users' experiences from moment to moment, providing a range of activities to address learners' needs; (6) invite the learner to participate in constructing the solutions and interpretations; and (7) embrace the ideologically driven nature of education and training.

While game-based learning has become an educational trend, practicing teachers have not wholly embraced the approach. In their quantitative investigation, Bourgonjon, Grove, Smet, Looy, Soetaert, & Valcke (2013) surveyed acceptance of game-based learning among secondary school teachers (N = 505). The median age of the teachers was 40, 57.3% were female, and 42.7% were male. The researchers found that many teachers

do not have experience with video games, yet believe that video games may afford learning opportunities for students. However, the majority of teachers believe that these learning opportunities are not inherently better than their current practice, and believe that GBL will not enhance their job performance. These findings stand in contrast to previous studies conducted on GBL's prevalence in the classroom (Sandford et al., 2006; Wastiau, Kearney, & Van den Berghe; 2009), which Bourgonjon et al. speculate may be due to regional differences and/or researcher bias. Teachers with previous experiences with video games or comfort with informational technologies are not necessarily more inclined to accept GBL in their classrooms. The authors suggest that GBL should become more visible in teacher training programs, as participants cited lack of information as a barrier to understanding and implementing GBL successfully.

Simoes, Redondo, & Vilas (2013) model a social-gamification framework for K-12 learning environments following Deterding's (2011) concept of "gamification": the application of game elements and levels to non-game contexts. The authors also define social games as games with an explicit goal of interacting and playing with people. Many of these games have found popularity on social networks such as Facebook. This framework converts game mechanics such as points, levels, trophies/achievements, virtual goods, leaderboards, and virtual gifts into game dynamics such as reward, status, achievement, self-expression, competition, and altruism, respectively. Within this framework, students experiment repeatedly until they reach a goal, complete tasks that are adapted for various skill levels, choose from a list of sub-tasks akin to a menu of quests, and inhabit different identities/roles.

Music-driven games such as *Guitar Hero*, *Rock Band*, *Donkey Konga*, and *Final Fantasy: Theatrhythm* inhabit a distinct game genre apart from platformers, first person shooters, and RPGs (among others). The existence of games that require musical skills to succeed suggests possible implications for the music education field. In their 2011 study, Richardson and Kim developed a framework for quantifying music skill developments from video game play. The authors observed 20 college students over the course of six weeks playing *Guitar Hero 2*, *Rock Band*, and *Rock Band 2*. The authors also administered pre- and post-tests to measure musical skills, including rhythmic articulation, pitch separation, accent and meter, harmonic relations, and pitch ordering. Ultimately, the games had little to no consistent effect on musical skills, but the authors acknowledged many weaknesses in the study design, and called for replication and further research.

Keeler (2020) conducted a similar study in which the researcher tracked rhythm skill development in players of *Guitar Hero: World Tour* and *Beat Saber*. While *Guitar Hero* utilizes a controller, *Beat Saber* is a virtual reality (VR) game in which players wear a helmet that “create[s] the immersive illusion of being somewhere else” (Rubin, 2018, para. 2). Keeler’s research questions were: 1. What is the difference in beat synchronization between students who played a traditional video game and a VR game? 2) What is the difference in rhythmic pattern imitation between students who played a traditional video game and a VR game? 3) What is the relationship between rhythmic achievement and perceptions of flow state? Keeler’s participants included college music majors; after the experiment he reported no statistically significant differences in beat synchronization or rhythm pattern imitation. However, results showed a direct

relationship between the variables rhythmic achievement and flow, with a stronger relationship among those who played *Beat Saber* than those who played *Guitar Hero*.

Micheloni, Tramarin, Roda, & Chiaravelli (2018) examined the use of *Musa*, a piano-based video game, to teach piano to children between the ages of six and eleven years old. Following a pretest questionnaire, students used a digital piano to perform different actions within the game, controlling an avatar with various notes and note patterns. After one week of playing *Musa*, students were able to recognize middle C on the keyboard and play it reliably. Piano and musical skills were embedded into the design of the game (“music was magic” in this world), particularly in the levels that introduced scales: the obstacles that the player had to overcome were placed spatially like a descending scale on the piano.

As a music theory pedagogue, Naxer (2020) theorizes collegiate music theory course design as a role-playing game (RPG) rather than a syllabus, and invites us to consider how RPGs function as learning environments. According to Naxer, learning music theory is not unlike beginning a new game: students create a student identity, develop that character, learn new skills, and overcome challenges. Regarding how they create and control characters, RPGs give players varying levels of autonomy, an integral part to Ryan & Deci’s Self-Determination Theory (2012). These games, according to Naxer, allow players to explore identity, meaningful choices, and volitional engagement. An RPG player and a music theory student may feel a sense of identity through character individuality, capability of the character to develop over time, and ability to control the character’s quantitative and qualitative progress. Naxer invites us to consider video games themselves as learning spaces, rather than tools to achieve learning goals.

In placing video games and GBL in the context of music learning, we must consider the nature of music and sound in video games, including how they function mechanically within the game code as well as player perception and negotiation of sound and music. In her 2013 book, *Playing with Sound*, Karen Collins theorizes game sound as every sonic aspect of a video game: dialogue, music, interface sounds, and ambient sound beds. Players may react to sound, enact sound, or even perform player-generated music in video games depending on the game.

To streamline the discussion, I conceive of game sound within two distinct categories: cues and tracks. Cues are more commonly known as sound effects; they often occur as a direct result of player action and are distinct from any music that may be playing. Cues are also often diegetic, occurring in the game world to be heard by players AND characters, but non-diegetic cues are not uncommon, often taking the form of interface sounds (clicks and beeps as the player scrolls through a menu). The potential congruity between what the player hears and their avatar's environment may reinforce the diegesis and offer spatial/physical information such as the direction of the sound's source in relation to the avatar. Cues can be the sound of footsteps coming from the player-character, a sound of a bomb going off in the distance, a line of voice acting, or an error sound to indicate that a player selected the wrong answer.

Tracks, derived from "soundtrack," are more commonly known as background music; tracks play while in a certain location or to portray a certain mood. Tracks are usually pieces of music that repeat or loop, and are usually non-diegetic, meaning they operate *outside* of the game world. The player can hear tracks, but the characters in the game world usually cannot, much like characters in film. While tracks traditionally

manifest as fixed audio files that the player cannot manipulate, recent advances in technology have allowed for adaptive tracks that change depending on player activity. For example, in *The Legend of Zelda: Twilight Princess*, the player's avatar character, Link, often has to traverse an open field that connects game locales. This field has a specific track assigned to it that starts when Link exits a locale and enters the field. However, the track changes depending on what Link is doing. When he is standing still, the player hears only the accompaniment in strings and percussion, but heroic brass enter the arrangement when Link dons his steed and rides. The track does not shift to a new track altogether, but the dynamism of the existing track layers reflects the actions of Link (and by extension, the player) and allows the player to enact game sound (one aspect of playing with sound, according to Collins).

With advances in console and PC technology, voice-acting has become a norm in games. This can include actual spoken dialogue (popular with larger RPGs such as the *Mass Effect* and *Dragon Age* series) or vocalizations outside of language (such as the grunts and "hi-ya!"s of Link in *The Legend of Zelda* series). In her interview and case-study research, Collins found that voice-acting as a sound cue had potential to either add to or detract from the game experience. While some respondents felt that voice-acting contributed to immersion, others felt that it interfered with their embodiment of the main character as they felt they could not project their own voice and personality onto the character. Voice-acting, therefore, removes the autonomy of the player to customize their character's personality, actions, and general affect to their liking. Without that autonomy present, players lose a component of Self-Determination Theory (Deci & Ryan, 2012) which may hamper the identity work that Naxer (2020) identifies as a crucial component

of GBL. Ultimately, the presence of voice-acting may immerse some players but impede the learning of others.

Grimshaw and Nacke (2011) further explore how sound creates an affective space for player-game interaction. They define affect as an information-processing system that processes immediate “gut feelings” triggered by an object, situation, or thought. By contrast, the process of cognition makes logical sense of all given information, bypassing initial reactions. The authors use three strategies to comprehend emotional player experiences in games: objective, context-dependent experiences measured physiologically, as subjective interpreted experiences measured psychologically, and a combination of the two. These emotional experiences can lead to flow, immersion, and presence, three states often sought-after by game developers.

In the Oxford Handbook of Virtuality (2014, p. 380), Harvey takes an ethnomusicological perspective to sound and music in virtual worlds, specifically in *Second Life*. *Second Life* is a “graphically rich, user-designed environment within which human participants interact via avatars.” Players can either stream music live into the game from their avatar or select pre-programmed music to play on parts of the game world that they “own.” This game world is aimless and offers no achievement-based rewards, contrasting the RPG structure of specific rewards for specific aims that Naxer uses to construct her music-theory course. Participants create meaning in *Second Life* via socialization and extension of their “real life” interests, which often include music.

In his 2003 book, *What Video Games Have to Teach Us about Learning and Literacy*, Gee argues that video games utilize good learning principles that are

transferrable to other contexts. He outlines 36 principles of good learning that can be found in “good games.” Games operate at the point of competence that Vygotsky theorized as the “zone of proximal development” (Yasnitsky, 2018). Due to customizable difficulty levels, games are often challenging, but still accessible. Good games also give information that is “in demand” and “just in time,” and promote transfer of information between contexts. Gee also asserts that players engage in “action at a distance,” not unlike remotely controlling a robot. Clark (2003) suggests that this type of fine-grained action from a distance causes humans to stretch their consciousness into a new space. This stretch encourages investment in the task at hand, which is the deepest motivation for a player mastering a game, according to Gee.

Denis & Jouvelot (2005) focus on motivation as a framework for designing music learning experiences that “reconcile learning and fun” as video games often do. They specifically utilize Deci & Ryan’s Self-Determination Theory as their model of motivation. In education, students with a high level of motivation are adept at selecting interesting information and enjoy strengthened attention. The aim of educational games is to harness this motivation with games instead of teachers as “knowledge-mediators.” Denis & Jouvelot assert that music education does not typically favor play before a rigorous understanding of theory and technique; often, reproaches during play lead to unpleasant emotions that diminish the pleasure of music play. The authors present *Cha-Luva Swing Festival* as a game that encompasses their best practices of educational motivation: reify values into rules, give power, tune usability, derail the gameplay, and favor communication. In *Cha-Luva Swing Festival*, the players operate in a jazz duet context in gameplay not unlike rhythm games such as *Guitar Hero* and *Donkey Konga*,

but with improvisatory elements as well as harmonic elements in addition to the rhythm. Unlike *Guitar Hero* and *Donkey Konga*, *Cha-Luva Swing Festival* was specifically designed for music learning, and thus the learning experiences of its players may not be transferrable to other contexts.

In the second volume of the Oxford Handbook in Music Education, Evan Tobias (2018) presents a “pedagogy that addresses the affordances of video games and virtual worlds for teaching and learning music.” He identifies the different ways that *Rock Band*, *Guitar Hero*, and *Def Jam Rapstar* visually represent vocal music differently, and how those representations alter the interactions between the games and learners. It is through this interaction, Tobias asserts, that players make meaning. Tobias ponders how MIDI controllers (fashioned after piano and guitar models) may be adapted to use as game controllers in addition to their MIDI functionality. He also invites us to consider the function of music in video games as an opportunity to open “new imaginative spaces for students to listen to, conceptualize, create, and perform music” (pg. 6-10). With all of the above in mind, Tobias offers four “mods” for music education, based off the practice of modifying video games as according to Poor (2014): 1) allow video games to coexist with other texts, instruments, and resources used in music classrooms and ensembles. 2) Embrace a mix of musical and gaming cultures, where students work within and across affinity groups on projects connected to their play. 3) Build on the affordances of video games, treating their constraints as learning opportunities. 4) Embrace multimodality, nonlinearity, and interactivity as they pertain to video games and music.

Tobias (2018), Denis & Jouvelot (2005), Keeler (2020), and Richardson & Kim (2011) all considered music learning within the context of games with explicitly musical

aims. While players of games such as *Guitar Hero* use musical skills to succeed within their magic circles, these games contain specific musical aims (“rocking out” as it were). Meanwhile, games where the goals of play are not musical still contain sound and music, which suggests ethnomusicological implications (Harvey, 2014). Collins (2013) offers a framework of kinesonarity to contextualize player-sound interactions, while Grimshaw & Nacke (2011) suggest affect as another means to make sense of player-sound interactions. While scholars such as Gee (2003), Beavis et al (2014), Hamari et al (2016), Squire (2008) and Bourgonjon et al (2013) have studied learning steeped in video game contexts (game-based learning), few have explicitly studied game-based music learning. Naxer (2020) transforms the traditional music theory course into one informed by RPG features, facets, and processes, but this transformation is mostly based in large-scale course design. In the following chapters, I will consider music/sound as a foundational framework through which learners learn in games, synthesizing scholars such as Tobias (2018), Nacke (2011), Collins (2013), and Gee (2003).

CHAPTER THREE

The Adventuring Party: Methodology & Participants

As I went to math class with Mr. Smith, I would think about my party members, aka my best friends Angela and Eddie. Angela was really nice and always made me feel better when I was sad. She was like the cleric of the party. She always healed me when I was injured. Eddie helped me with math, which I always struggled with. He was a wizard! He casted spooky spells like “Fractions-Kazam!!” and “Denominatorious!!!”

I wouldn't have survived this dungeon (math class) nor beat the boss (math class) without them!

It is not uncommon in role-playing games (RPGs) to have a group of characters traveling together as a collective protagonist. RPG parties may consist of only a few characters or occasionally a large ensemble (entries in the *Final Fantasy* series, a popular RPG franchise, have ranged from three characters in *Final Fantasy X-2* to fourteen in *Final Fantasy VI*). I borrow this convention from games to consider how the participants comprise the adventuring party of a qualitative research study. While I, the researcher, am engaging with their experiences as a player might, it is ultimately their story to tell. The participants are the main characters around whom the story revolves.

The purpose of this phenomenological research study was to explore participants' experiences with learning through sound in video games. To this end, I used a qualitative methodology, which Leavy (2017, p. 9) defines as “inductive approaches to knowledge building aimed at generating meaning.” Leavy also specifies one of the aims of qualitative research is to “unpack the meanings people ascribe to activities, situations, events, or artifacts” The aforementioned activities, situations, and events may be researched as *phenomena*: structures of human consciousness to be examined through the

first person (Hourigan & Edgar, 2014). In this case, the phenomenon in question is learning from, through, and with sound in video games. While phenomenology is considered by some to be the underpinning of all qualitative research (Merriam, 2009; Bresler & Stake, 1992), Hourigan & Edgar (2014) posit that a true phenomenological study consists of a phenomenon as the basis of the study combined with phenomenologically analytic structures.

Video game music as a directly educational tool is a fairly well-researched phenomenon; however, in this research I sought to explore how people already engage with video game music and sound outside of a traditional classroom. Therefore, I determined that an inductive research design in which the subject originates the knowledge for researcher interpretation was most appropriate. As an inductive research paradigm, phenomenological research relates to social constructions around specific experiences and activities. Phenomenological researchers also construct meaning by combining “objects of consciousness” (what we perceive and experience as people) and “objects of nature” (what we learn/are told to be true) (Moustakas, 1994). Applied to the present study, the objects of nature are the video games and the sound therein, and the objects of consciousness are the interactions and engagements between the game sound and the players/listeners (or in the context of qualitative research, the participants).

In the fall of 2020, I proposed a short description of this study that included the purpose statement, interview questions, and a preliminary literature review to the James Madison University Institutional Review Board, which approved it for expedited review without revisions. I was then permitted to recruit participants and begin data collection.

PARTICIPANTS

I recruited participants (N = 8) based on self-reported identities of “musician” and “gamer” to participate in a focus group and semi-structured individual interviews during data collection. Participants therefore fell into one of three identity strata: musicians, gamers, and people who identified under both labels. Krueger (1994) suggests the ideal size of a focus group to be between six and nine participants, which I used as guidance to determine an appropriate number of study members.

The question of “what makes someone a musician?” has baffled scholars and practitioners alike and will likely continue to do so as long as divergent musical conceptions, practices, and traditions exist. Praxial music philosophy scholars such as Elliot, Regelski, and Alperson consider a musician to be a “doer” of music (Alperson, 2010; Elliot, 1995), while aesthetic music education philosophers such as Reimer and Langer would disagree, as their philosophy hinges on the acknowledgement and appreciation of the unique value of “great works” (Reimer, 1988; Smith, 2010). However, this philosophy has come under criticism for its reification of European classical musical traditions as well as the inherent exclusion of non-Western non-classical musics and the self-identified “musicians” that practice them (Elliot, 1995).

Meanwhile, the question of “what makes a gamer” is similarly baffling and fraught with social baggage. Video games have been more heavily marketed to males in the last two decades (Salter, 2017; Lien, 2013) leading to “gamers” becoming a male-dominated group. Games widely considered to be “serious games” often feature exaggerated gender roles and oppressive tropes, including the “Damsel in Distress”, the “Ms. Male Character”, and “Women as Background Decoration” (Sarkeesian, 2013a;

Sarkeesian 2013b; Sarkeesian, 2014). As a departure from this heterosexual male-dominated landscape, independent game developer Zoe Tiberius Quinn released *Depression Quest*, through which she explored her own experiences with depression in an experimental, non-violent format. While the game was well reviewed by the media, it was poorly received among “gamers,” and Quinn became one of many subjects of a misogynist harassment campaign now known as “GamerGate” (Salter, 2017). Quinn, among many other women in the video game industry, received death and rape threats by members of online communities such as 4chan, Reddit, and Twitter. While the harassment was motivated by a myriad of factors, one of those factors was the attempted reclamation of the identity of “gamer” by straight males. The “social justice warriors” who were perpetuating a culture of feminist and queer critique in the media and online seemed to threaten those who sought to reclaim the “gamer” title (Massanari, 2015; Salter, 2017).

For this study, I sought a participant pool that reflected a multiplicity of musical and gaming experiences. However, identifying satisfactory inclusion/exclusion criteria for participants in scholarly literature or practitioner publications that ascended beyond the fraught past of “musician” and “gamer” identities proved challenging. The qualitative research paradigm privileges the participant's lived experience over the epistemology of the researcher; therefore, I followed participants’ self-identifications. If they felt like they qualified as gamers and/or musicians, I assigned them to the associated category.

The “musicians” and “musicians/gamers” were recruited via an email sent to students, faculty, and staff of a public mid-Atlantic university school of music (see Appendix E). Respondents were all college music majors. When someone expressed

interest in study participation, I responded asking whether they identified as a “gamer” as well. This allowed a swift recruitment of three participants for the “musician” category and another three participants into the “musician/gamer” category. To recruit “gamers,” I sent an email (see Appendix F) to several local game stores in my geographical area requesting them to disseminate my call for participants to their clientele, and I received two emails of interest.

Participants were reflective of a variety of experiences in both music and games. In order to maintain confidentiality and in accordance with my IRB protocols, I assigned pseudonyms to all participants.

Amanda (musician/gamer). A college student majoring in music composition, Amanda described herself as a self-processed life-long gamer. Starting with a GameCube and GameBoy, Amanda gravitated toward movie video games growing up, such as *Shrek2* for the GameCube. She expanded her video game interests to include more mainstream games such as *Pokémon* and *Minecraft*. At the time of the study Amanda was an active double bass player, having played in all manner of ensembles, including wind ensembles, orchestras, and even a “bass choir.”

Antonio (gamer). A videographer by profession, Antonio described video games as his “main hobby” in which he had partaken since elementary school. His primary video game interests were fighting games such as *Street Fighter* and *Mortal Kombat*, but he also shared a soft spot for rhythm games such as *Elite Beat Agents*, *Guitar Hero*, and *No Straight Roads*. He described his experience in music as “[trying] to play the violin in high school. Key word is try.”

Bill (musician). A freshman in college just starting a major in music composition, Bill described his gaming experience as sparse, saying that he didn't "play a lot of [video games]," and that it was only recently that he became interested in the primary genre he plays now (first person shooters). Bill played the euphonium as part of his collegiate music studies.

Boris (gamer). Growing up, Boris' gaming was limited to renting a Nintendo DS and playing the occasional Mario game. At the time of this study, he mostly played shorter games he described as "casual," adding that he played Mario games with his then seven-year-old daughter. While he played the saxophone extremely briefly in fifth grade, he received a lot of "second-hand music" from being married to a church organist. Otherwise, Boris does not play music himself and doesn't identify as a musician.

Heather (musician). A college-aged violist, Heather played a lot of video games as a kid but as her studies became more intense, she curtailed her video game playing. She closely associated gaming with her dad, who would play games with her when she was younger. The genres she most closely played at the time of the study are action-adventure games and some massive multiplayer online role-playing games such as *World of Warcraft*.

Jeb (musician). A senior in college about to graduate at the time of this study, Jeb was a music education major and a saxophone player. His video game experiences formed around other interests such as *Star Wars* movies and *Pokémon* cards translating to their respective video games. He cited video game music as some of his earliest and most formative music experiences, particularly since he did attend a traditional general music class in elementary school.

Kareem (musician/gamer). Also, a music education major, Kareem played largely RPGs and rhythm games growing up, and still played those games regularly at the time of this study. Kareem reported that they played violin and flute, but also created their own chiptune music.

Kyle (musician/gamer). In his last semester of his music degree, Kyle reported a wide variety of gaming experiences, although he rejected the label of “hardcore gamer.” Most of his gaming growing up focused on Nintendo mainstream franchises such as *Super Mario Bros.* and *The Legend of Zelda*. At the time of the study, he enjoyed playing games in short spurts on the Nintendo Switch, as it fit neatly into his professional obligations. In addition to playing games, he often transcribed video game music in his free time and played bassoon and piano in his musical practice.

Participants’ experiences and genres of gaming varied quite widely. All of the study members played various genres of games as children, which in most cases remained their preferred genres of play in adulthood, including role-playing games, first-person shooters, rhythm games, fighting games, and action-adventure games. Additionally, while six of the participants were college music students, their backgrounds varied between performers, educators, and composers and they played a range of different instruments such as violin, viola, bass, flute, saxophone, bassoon, and euphonium. A diversity of primary instruments indicates a diversity of musical preferences and perspectives. For example, a flutist might notice and interpret the presence of a flute or flute-like timbre differently than a euphonium player might. However, there were no vocalists, guitarists, conductors, pianists, or other kinds of musicians that may have different perspectives. Two participants (Boris and Antonio) did

not currently engage in music making activities and did not consider themselves musicians yet they were able to articulate their game music experiences.

Data Collection

Data were collected in two sequential phases: a focus group interview and individual follow-up interviews. Patton (2002, p. 385) describes a focus group interview as “an interview with a small group of people on a particular topic,” in which the group interaction defines the focus group interview against other types of interviews. The researcher thus takes on a role as participant observer as well as interviewer, as discussion may occur between participants that doesn’t require or involve the researcher. Additionally, focus groups must be *focused* on a particular topic with specific questions and other structures that may ensure the relevance of the data to the study’s purpose (Eros, 2014). Therefore, given the phenomenon of video game music learning, the focus group structure emulated a popular mode of video game spectatorship: Twitch streaming. Streamers use Twitch, a social media website designed for streaming audio-visual content, to play video games live while internet users watch and offer comments in a chat log (Hamilton, Garretson, & Kerne, 2014). Twitch streams come in many combinations of players/spectators, but in the case of this study, I acted as the single player and the participants were all chat spectators as I was playing games streamed through Zoom. This allowed the participants to communicate with me and each other in real-time without talking over important audio moments occurring in the game. As the player, I occasionally paused the game action to ask questions, or engage with the chat. The games I played were *Super Mario Bros.*, *Super Mario World*, and *Final Fantasy V*—games that

I already owned and could easily stream into a Zoom call without sacrificing audio and video quality for the participants. After twenty minutes of gameplay, I then played eight game tracks from various games and asked the participants to describe what they were hearing and take guesses on when this track might play in the game in which it is heard. Following this portion, the interview became more like a traditional focus group interview, with the researcher posing questions relating to the study's purpose for the group to discuss. Total interview time was approximately ninety minutes.

Kamberelis and Dimistriadis (2005, p. 204) assert that focus groups “allow for the proliferation of multiple meanings and perspectives,” which is why I chose this method of data collection for this phenomenological study. In the focus group space, participants offered a multiplicity of views, opinions, and experiences relating to game sound, which generated discussion. I facilitated this discussion with a self-generated moderator's guide (Krueger, 1994). This guide contained the discussion questions, procedural steps, and other scripted statements for the moderator (in this case, myself) to utilize (see Appendix B). The focus group phase of data collection served as a pilot for the second phase of data collection (individual interviews). This allowed for customization of interview questions to adapt to the emergent and iterative nature of qualitative data collection (Hammersley & Atkinson, 2007).

After the focus group interview, participants engaged in individual semi-structured interviews, which lasted between 20 and 50 minutes.. Interviews were scheduled at the conclusion of the focus group interview before the participants left the Zoom meeting, and occurred virtually between four and six days after the focus group interview. Roulston (2014, p. 251) defines a semi structured interview as a process in

which “researchers use a topical guide to generate talk.” While I created 6 interview questions prior to the interviews to use as a common topical guide (see Appendix A), I asked each participant various follow-up questions based on topics they brought up that related to specific tenets of the research. Following data collection, I uploaded the audio recordings of focus group and individual interviews to the Temi transcription service (temi.com). I saved the Zoom chat transcript from the focus group interview as a .txt file and inserted entries into the transcription where they occurred.

Once I conducted and transcribed all interviews, I coded the transcripts iteratively using NVIVO qualitative analysis software. A code in qualitative research may be defined as a word or phrase that captures the essence of a portion of linguistic or visual data (Saldaña, 2013). In the first iteration, I employed “in vivo” coding, in which codes are generated from the words of the participants, rather than a summation of the researcher (Saldaña, 2013). This method, averaging about one code per sentence of data, generated 1,494 codes. Using a comparative process, I then combined those codes into the following categories based on commonalities: Kinesonic Synchrony, Music Experience, Video Game Experience, Music Descriptors, Kinesonic Incongruity, Video Game Music Utility, Gameplay, Investment, Game Elements Containing Sound, Emotions, and Individuality. I further explain these categories in Chapter 4. Upon emergence of categories, I coded the interviews again using a focused, holistic method: applying codes that relate to the in vivo generated categories to large swathes of data (Saldaña, 2013). The second round of coding assisted in a form of triangulation of the first round, and I was able to subsequently combine the categories into the following two

themes: Kinesonarity and Affect. In the next chapter, I will present these themes along with the accompanying data in greater detail.

CHAPTER FOUR

The Campaign; Data & Analysis

I enter a scary dungeon. Spooky strings start to play long notes as I step carefully, the light flickering in this cave as my torch hand shakes with anticipation. As the strings get louder and louder, I hear something moving. What was that? Suddenly, I see the boss, a scary dragon monster! The drum set starts laying down a beat as I begin the battle. Rearing back, the dragon readies its Fire Breath attack:

“Lucie, please take your seat. Class is about to start”

In video games, the “Campaign” usually refers to the main quest of a game, often that a single player undertakes following a narrative. A campaign may contrast alternative modes of play that may be multiplayer, but do not often contain a narrative. Games like *Super Smash Bros. Ultimate* and *Halo* contain both single player narrative campaigns and non-narrative collaborative/competitive modes of play, while games such as those in the *Final Fantasy*, *Dragon Age*, *Mass Effect*, and *Dragon Quest* series’ only have campaigns (and others, such as those in the *Mario Kart* series, don’t have campaigns at all). In Chapter 3, the eight participants were introduced as the adventuring party. In this chapter, they embark on their adventure.

The purpose of this phenomenological research study was to explore participants’ experiences with learning through sound in video games. Participants were selected according to the following profiles: Musician, in which the participants were pursuing careers in music and/or actively participated in musical activities; Gamer, in which the participants’ experiences were contextualized more by gaming experience than musical experience; and Musician/Gamer, where participants were both actively participating in music activities and spending a self-identified significant amount of time gaming. I

applied these descriptions retroactively based on the data once the participants self-identified their category. Musician participants included Heather, Jeb, and Bill; Gamer participants included Boris and Antonio; Musician/Gamer participants included Kareem, Amanda, and Kyle. I initially interviewed participants together in a focus group, and subsequently through individual interviews, all of which were transcribed and in-vivo coded to generate categories. I then combined categories into two themes: Kinesonority & Affect.

Theme 1: Kinesonority

Collins (2013) identifies the different varieties of kinesonority as referring to both action (“kine-”) and sound (“-sonic” or “-sonority”). Much of what the participants reported in their interviews related to player action of some sort, hence the need for an action-related framework to contextualize their learning experiences. Under the umbrella of kinesonority, three varieties exist: Synchresis, Incongruity, and Congruity.

Kinesonic Synchresis is the fusion of player action and game sound into one event. Collins (2013) elaborates that “interactive sound is event-driven, and the sound is controlled by an action or occurrence that is initiated by the game or the player” (pg. 32). In the case of video games, the “action” may refer to a player physically manipulating a controller or their own body (i.e., pressing a button), or an avatar doing something within the game (i.e., the game avatar jumping). A classic example of this phenomenon is in the *Super Mario Bros.* series: when Mario jumps, a springing sound effect plays. Mario jumps (avatar action) as a result of the player pressing the jump button (player action). The player may begin to blur the distinction between player action and avatar action and associate pressing the jump button with the sound effect. When Mario’s jump ability is

hampered by an obstacle, the sound effect is ended earlier than usual. When a sound effect (or lack thereof) defies expectations in comparison to the accompanying action, a player may experience Kinesonic Incongruity, which is often surprising for that player. Although their eyes may not be centered on the avatar, their ears may register the kinesonic incongruity and thus learn that jumps are impeded or otherwise ineffective, even without seeing Mario's physical impediment. Inversely, Kinesonic Congruity may occur when game sound fulfills expectations, with or without the fusion of action and sound (Collins, 2013).

In creating this theme, I combined like codes into the following categories: Synchronesis, Video Game Elements Represented by Sounds, Silence/Absence of Sound, Musical Experience, Gameplay, and Utility of Sound. Together, these categories form the theme of Kinesonority in a discussion of how participants experienced game sound as it related to their in/out-of-game actions.

SYNCHRESIS

As previously stated, action and sound may become inexplicably linked through the process of kinesonic synchronesis. Participants reported many examples of learning through direct synchronesis, including the learning of explicitly musical skills. In the genre of "rhythm games," player action is based entirely off of the music, often in a rhythmic context. Antonio's experience with kinesonic synchronesis was largely with one of these games: *Elite Beat Agents*.

A large part of it is you have to listen to the beat of the music, but each of the beats of the music were dictated by the stylus on top of the visual cues. But what



Figure 1 - Elite Beat Agents gameplay image, in which the numbered circles are meant to be pressed by the stylus when the outer circle reaches the inner circle. (IGN.com)

helped me as I learned to play the game more was that every time you hit a beat, whether it was correct or incorrect, it would play a different sound. Or if you missed it entirely, it would play no sound at all. So as I played each song, in my mind, I didn't even have to look at the beats anymore, like the circle of the beats so much as if I heard like the symbol, which indicated a perfect, like perfect beat drop, that was it. And I just, I kept on it like that almost to the point where I was looking less at the visual side of it and more like getting into the rhythm of the music and allowing the auditory cues of the symbols for each note to basically keep me in rhythm.

In *Elite Beat Agents*, there is a visual cue that corresponds to the beat of the music: the player taps two concentric circles when they overlap to succeed and score points (see *Figure 1*). While Antonio initially relied on these visual cues to proceed through the game, the synchresis of the “success” sound cue, the beat of the track, and the stylus tap became the key to his success after an initial familiarity with the music. Antonio did not consider himself in the “musician” group, yet he was able to use the tools within the game to keep himself “in rhythm” successfully enough to beat the entire game. Antonio spoke of this game rather fondly, as it sparked a love of the rhythm game genre that led him to games such as *Guitar Hero* and *No Straight Roads*.

In the focus group, the participants discussed how certain sound cues communicated certain things to the player relating to their action (and even to them, the observers). Boris and Kareem both noted that texture was more easily communicated through sound than with visuals, such as the sound effect of Mario skidding through dirt and the metallicity of receiving a coin. Amanda likened the general sound palette to a kid playfully banging on toys, since many of the sound effects accompanied some kind of physical action such as a collision. Occasionally, when player action was interrupted, the music stopped as well to signify to the player that they’re “not in control” anymore, according to Jeb.

VIDEO GAME ELEMENTS REPRESENTED BY SOUNDS

Game sound may reflect changes in player state or locale that become linked with said state or locale. Boris discusses a synchresis between the star power-up music in the *Super Mario Bros.* series and the skill affordances that a star power-up gives the player. In this case, the star power-up state is the video game element being represented by a

sound. In almost every mainline *Super Mario Bros.* platformer, getting a star turns the player invincible, and in some games, gives the player a boost in speed. Since many of the normal hazards are temporarily no longer hazards, the player may advance through the level much more quickly and less hesitantly than normal. Rather than disrupt the action with a text box conveying that information, the high tempo/energy music (roughly 160BPM depending on the edition of the series) that accompanies the star power-up's duration encourages the player to move more quickly than they would while listening to the more laidback regular music (which is roughly 85BPM, or 75BPM slower than the star music). In the *Super Mario Bros.* series, the invincibility of the star state and its music remain unchanged, so even when players play other games within the series, these game elements are linked and may be considered to represent each other.

In the focus group interview, participants listened to and described video game tracks with which they were mostly unfamiliar. These descriptions were often in the form of possible game locations that may exist across different genres and styles of video game. Examples of these locations include “town,” “forest,” “city,” “title screen,” “dungeon,” and “shop” (see Table 1). In this case, the tracks seem to represent these kinds of locations via evocative musical material.

MUSICAL EXPERIENCE OF PARTICIPANTS

Some participants contextualized their game sound experiences with their prior musical experiences. Six of the participants were college music majors with backgrounds in composition, education, and performance, while two of the participants described themselves as having minimal to no experiences making music.

Some of the participants viewed their musical training as an asset. Kyle, one of the musician/gamer participants, noted that “it’s cool to be like ‘hey that was an antecedent followed by a consequent’” and likened his music analysis process to a “scar” on his head, saying that it’s “neverending.” Jeb, one of the musician participants, asserted that his training helps him understand video game music more, but it’s not always a process in the front of his mind:

I think because I'm able to understand it more, I can be like, Oh man, this is like the climax of the piece, or, Oh, we're like kind of losing energy here. This is decrescendo-ing there. This is the instrumentation there. I can kind of analyze it more at the same time. However, I think as far as collegiate, like in terms of a collegiate music setting, the fact that I'm around music so much makes it, so when I'm playing video games, I kind of don't focus on that. Like I know I'm just kind of tuning it out and I'm trying to, like, I know it's there and it's in my head, you know, the background music is in my headset, but I'm focused on the game solely sometimes solely to get away from the music world.

Jeb’s use of video games as an escape from the responsibilities of his professional life (in this case, the music world) did not lend itself to any sort of analysis while playing.

However, in the focus group interview, Jeb’s responses to tracks became quite analytical, at least regarding the use of music theory terminology (such as “octatonic”, “V/vi”, and “6/8 over 3/4”) to describe the music (see Table 1), which was in contrast with the rest of the participants’ responses:

I was trying to just do stream of consciousness and I listened to music, very analytically. And so, I think it came out that way too. And some of the comments

that I had, which is I recognized was, is not like the most common thing. So just kind of reading other people's descriptions of things kind of gave me more like, like a broader view, if that makes sense. So it wasn't really like surprising to me, but it did kind of like, it helped me like fit my points into a larger picture.

Kareem, one of the musician/gamer participants, contrasted their own experiences as a gamer with music conservatory training with the experiences of their siblings, who lack that training:

[They don't have] the same language that I might have to describe what's going on or maybe they don't know what instrument that is, but I think they can pick up on those cues. And I think in a way, having an easier time simplifying and describing it, because I know I might try to overthink what I'm listening to if I really sit down to it. But I think especially people who may not have to say my classical or school of music/conservatory style training could just be like, "Oh, it sounds spooky because the way the guitar is going" and I would have just tried to figure out what the guitar is doing or whether or not it was a guitar or some other string instrument.

Kareem viewed their conservatory training as a hindrance, rather than an asset, strength, or skill like Jeb and Kyle did. As a "non-musician" gamer, Boris acknowledged a subtler music perception than the musician participants:

I guess it makes it a little more subtle. I can pick up on like the cues that are, I think, more pervasive. So, when the tempo goes up, realizing that that means like, Oh, you need to speed up or do whatever, or sort of like more basic that I think

someone was bringing up syncopation in our focus group is still have no idea what that means. So, uh, not, not that level of intensity.

Amanda, as a sort of amalgamation of the two ends of this spectrum, changed her actions in game to allow herself time for musical analysis and/or enjoyment. When she heard music she really liked within a game, she would stop her character and listen to the music for a while before moving on. The analytic side of her musical experience was ultimately too challenging to ignore.

GAMEPLAY

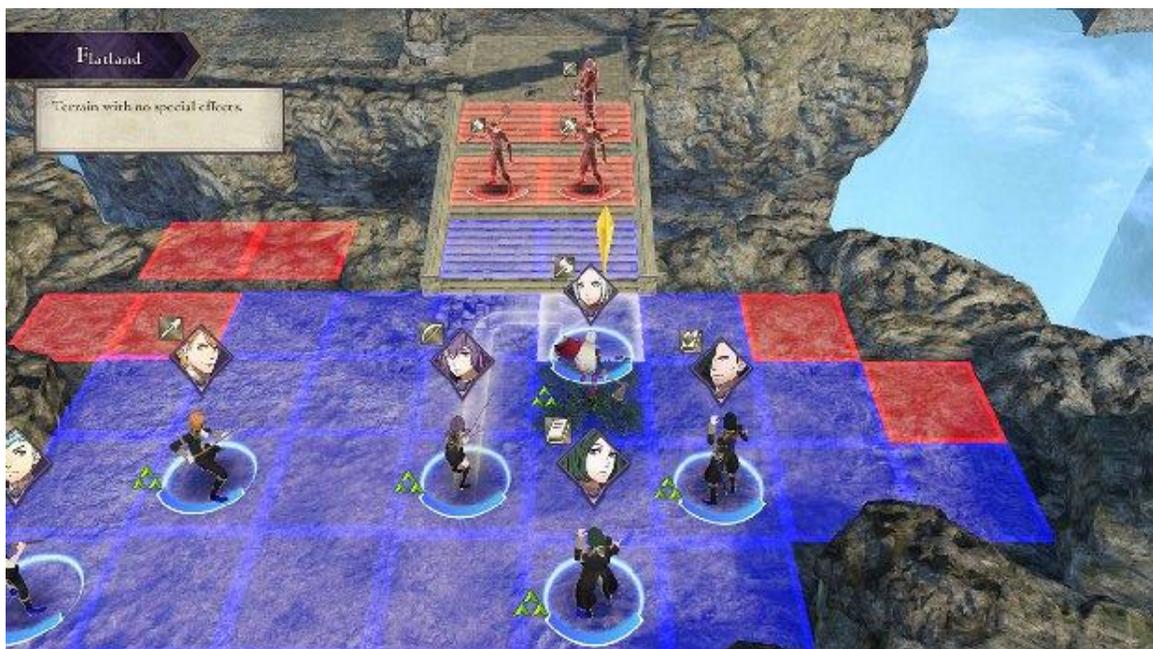


Figure 2 - "Rain" mode of *Fire Emblem: Three Houses* combat, in which the player is giving commands to individual units, but nothing has explicitly happened yet (Woo, 2019)

Amanda and Kyle both identified *Fire Emblem: Three Houses* as a game in which tracks paired with player actions. *Fire Emblem: Three Houses* is a Strategy Role-Playing-Game in which combat exists in two stages: in the aforementioned "Rain," the camera is zoomed out to view the whole battlefield while the player plans actions for the characters

(see *Figure 2*), after which those plans are carried out with a theatrical zoomed-in camera in “Thunder” (see *Figure 3*) Amanda made a distinction between the “Thunder” and “Rain” versions of tracks that play during combat:

When you're in a battle, when you're high up, when you're looking at the whole map and you're making your strategic move, it's playing the Rain theme of the track where it's, I mean, it could be however intense the track is, but it's more lyrical. You can hear the melody a lot better, but when it zooms in for the actual fight between two characters, it's super heavy. It's almost harder to hear the melody. And it's like that for every single battle theme. I always prefer the Rain because you can hear the melody better and it's just overall more melodic.



Figure 3 - "Thunder" mode of Fire Emblem: Three Houses, in which orders given to the units (in this case, Dimitri) in "Rain" mode are carried out. (Shepard, 2018)

On the other hand, Kyle revealed that he chose to play in Rain mode only, and subsequently never heard the Thunder theme in play.

I think for each of the battles, it's got two versions: it's got the overhead theme and the zoomed in theme: The Rain and Thunder versions. I think I actually always play zoomed out. So, I don't think I necessarily noted it, but then when I go on YouTube and look up, you know, analyses or reviews or whatever (because I'm nerdy and I do stuff like that), you can see how it transitions from the rain theme to the thunder theme seamlessly.

While Amanda resented that change from “Rain” to “Thunder,” preferring the melodic presence in the Rain theme regardless of the action shift, Kyle was unaware of the Thunder track’s existence (until he consumed out-of-game news media on the topic) due to his in-game actions, which differed from Amanda’s.

UTILITY OF SOUND – GAME AS AGENT

Many of the participants described game sound generally as “reactionary,” or “reacting” to player action. Antonio, in the focus group, asserted that game sounds were “always kind of a reaction,” where he enacted game sound from his in-game actions. In the reverse, Jeb’s actions reacted to the game sound, as opposed to the sound reacting to his actions. When he plays *Call of Duty*, his tactics shift based on what he can hear. He described hearing a bomb sound cue and thinking “oh darn, I gotta run” to escape the imminent danger that the cue represented. In another example, he cited the necessity of proper audio equipment to play at a high skill level:

They amplified your steps a lot. And so it's almost, like, necessary to own a headset so you can hear the footsteps of someone coming. So, you know, that it's about, so I'd say much more in the later games, those sorts of sound of the short

sound effects are like more advantageous and the better audio quality you have in your game experience, the better you're going to be simply because of that.

In Jeb's experience, the fidelity of sound had a direct relationship to the aptitude of the player because of the sound's relationship to gameplay hazards and threats. Players of *Call of Duty* without a headset or even those who might play with no sound at all may have a harder time safely navigating the multiplayer combat arena than others.

SILENCE/ABSENCE OF SOUND

Many modern games allow the player to customize balance between cues and tracks, even allowing you to turn one or both completely off. While many of the participants (Kyle, Kareem, Amanda, and Antonio) prefer the sound effects turned down to favor the music, Boris often turns the music down to favor the sound effects.

I usually turn the music lower or the sound effects higher, cause I think can sound effects are more, um, important to my perceived perception of the game versus the music. Um, but I don't know. Because I think that the cues from the sound effects more clearly articulate what the action is and what's going on versus the music. But I do think the music sets the tone for the environment, uh, which I think once that's established, I don't think it necessarily needs to continuously be established. So I know where I am, but the sound cues and sound effects are more important to the actual action within the game.

To Boris, since many video games loop their tracks until a level is cleared and/or the location/mood has changed, the music becomes irrelevant after a while since the affect of the environment has been established already. Cues present a dynamic and

continuous kinesonic companion to the gameplay, whereas music may be strictly affective, at least in Boris' experience.

Theme 2: Affect

In addition to action, game sound may communicate certain affects, emotions, or “vibes”—particularly the music, or tracks. Certain tracks may play purposefully while the player is exploring a specific locale, or when engaging with a specific character or idea (e.g. leitmotif in the Wagnerian opera tradition, as directly identified by Bill in his interview). Hearing a familiar thematic track, whether later in the game or outside of the game entirely, may have a transportive effect on the player, and contributes greatly to the nostalgic power of video game music to engage listeners and players (Ombler, 2020).

In the focus group, participants listened to tracks divorced from their context and identified how the tracks made them feel, as well as what might be happening in the game when that track would play. Participants reported a variance of familiarity with some tracks, but none of the participants knew every track played.

In Table 1 participant descriptions are listed alongside each track name and source video game. Almost every description is a direct quote, with some grammatically truncated for brevity (e.g. “the way that it’s done makes it more grand” → “more grand”).

Table 1 – Participant Chat Descriptions of Video Game Tracks

Track	GAMER (Boris/Antonio)	MUSICIAN (Bill/Heather/Jeb)	MUSICIAN/GAMER (Amanda/Kareem/Kyle)
<i>Battle Theme</i> <i>Final Fantasy IV</i>	hype, not a hard battle, overpowered hero	Title Screen, epic, makes me feel excited and anxious, heroic/quest-based game, mediant-tonicizations	Battle music, meant to instill excitement, action/fantasy game, I could definitely win,
<i>Kakariko Village</i> <i>The Legend of Zelda:</i> <i>Ocarina of Time</i>	old-west town, fantasy, calming, like some old western films I've seen, calming nature	classic genre, area theme, forest area, relaxed, reminds me of that one Beethoven symphony, form, simple melody, underlying motor like a harp, 6/8 over ¾, legato and arpeggiated, harmony isn't insanely chromatic	Calm, opening village, cutscene, plot-driven but...not necessarily doing something physically, legato, arpeggiated
<i>The Quarantine Chronicles</i> <i>The Last of Us</i>	more tense, uncomfortable, bad news is being shared, on edge, slow build reminds me of Metallica,	As you enter a dungeon, title screen, dissonant and awkward, daunting, rustic or medieval vibe from guitar, about to get attacked, hollow and brash, uneasiness, pulsating, narrative cutscene, anxious	tritone, action game, perhaps a dungeon, protagonists are just vibing, serious and sinister, maybe a deity is involved, bad news,
<i>Battle</i> <i>The Legend of Zelda:</i> <i>Ocarina of Time</i>	Going into battle, movement and intensity, marching of troops to a dire battle, uneven harmonically,	running, octatonic medley, sounds like background music for a fight, anxious and repetitive, accented offbeats makes is feel even more anxious, snare is bitingly short, feelings of flight	percussion heavy, battle or dungeon, continuous roll drives it forward,
<i>Snowdin</i> <i>Undertale</i>	area theme, someplace happy, home location, farm, suspended, somber	Shop theme, relaxing, cute, timbre makes it very whimsical, wide tessitura, sporadic, upbeat from pizzicato, contrasting flowing B section, relaxing, town at night time, somber	town early on, home town, welcoming, light and bouncy, hopeful, last peaceful town before something goes wrong, underlying tension, world is about to fall apart.
<i>Home</i> <i>Undertale</i>	Very hopeful, resolution, end of the game	rural, V/vi back there	explicitly happy, something good
<i>Town Theme</i> <i>Final Fantasy IV DS</i>	fantasy town, lost city, title or waiting scene	Lush, relaxing, uneasy/sad, foreboding and ironic, saying goodbye	fantasy, cutscene, saying goodbye to a companion, in-game marriage but with swords, something fishy is going on, dialogue
<i>Welcome to our Town!</i> <i>Final Fantasy IV</i>	grander, organ vibe	more metered, duller, open, echoey, chord progression reminds me of Piazzolla Tango etudes, less legato, more connected	<i>Final Fantasy</i> vibes

When a player walks into Kakariko Village for the first time, they may feel calm, relaxed, and perhaps like they're in a western with no information other than the track that plays. Similarly, when a player enters a battle in *Final Fantasy IV*, they may feel a sense of excitement and anxiety. While some of the musician and musician/gamer participants used specific terminology such as “chromatic,” “B section,” and “legato” to describe the tracks, most of the verbiage was analogous in nature; connections were drawn between the sounds and settings such as “towns,” “forests,” and “battles.” Additionally, many of the participants used emotional/mood descriptors such as “somber,” “hopeful,” and “uneasy/sad.” Even without any dialogue or visuals, the tracks can convey a myriad of information to the player.

In forming this theme, codes were combined in to the categories of Emotions, Video Game Experiences/Nostalgia, and Music Descriptors. The codes in these categories all described various affective experiences, reactions, or qualities within game sound that were distinct from the gameplay focused codes in the first theme. Therefore, the second theme is a discussion of the participant's experiences with the affective power of game sound.

EMOTIONS

When discussing their experiences with video game music learning, many participants used words that referred to direct emotions. Examples include “anxious,” “calm,” “creepy,” “happy,” “stress,” “on edge,” and “excitement”. Heather shared that her emotional state often matched the perceived emotional state of the music, knowing “when to calm down when the music's calm...time to fight when the music ramps up...I know something serious is about to happen” adding later that “calm music is in calm

places.” Additionally, aesthetically pleasing sound cues motivated her to complete tasks “so I can get the little award sound at the end, because I like that sound!”. Bill had similar thoughts about the cues in *Super Mario Bros.* that they sounded “fun”, so he felt like he was having fun. In the focus group, Kyle and Jeb both agreed that the Battle Theme from *The Legend of Zelda: Ocarina of Time* had different factors that contributed to “unease and tension.”

In the focus group and again in his individual interview, Antonio offered that “Snowdin” from *Undertale* makes him “so sad, but only because I know the game.” When asked to elaborate, he specified that the music contained narrative implications that contained certain emotional power:

You realize that even though it's a good ending, it means one of the characters still dies, but their fate is like really tragic and really sad. So like, anytime I hear that specific like set of notes, no matter how it's done, it always gives me like this sense of, Oh my God, this poor character, they—they're gone. There's no ending where they survive kind of thing, you know? And I think it's just one of those, like, I latch onto the most powerful, like melodies.

Kareem concurred in the chat, saying that “Undertale makes me cry every time.” Meanwhile, those that were unfamiliar with *Undertale* described “Snowdin” as “welcoming,” “relaxing,” “cute,” and “upbeat.” The discordance between Kareem’s and Antonio’s perspective and that of the rest of the participants corroborates Grimshaw & Nacke’s (2011) assertion that affective responses were “gut feelings” based on a single thought (for Antonio, the death of a character) that lie separate from cognitively making sense of all of the information (e.g. instrumentation, timbre, game locale).

VIDEO GAME EXPERIENCES/NOSTALGIA

Participants often used past video game experiences to contextualize possible new ones, particularly in the focus group interview. Kareem described himself as being “socialized with games” and offered that as an explanation for their affective perceptions.

Even when we weren't like looking at whatever was happening in the game, we could kind of tell that this was like supposed to be a village because it's serene...I know sometimes in games like cutscenes, we'll start with a black screen and maybe the music will start first, so you can kind of get a gauge on what's about to pop up. Um, but I can't really specify. That's probably just like how I was socialized with games and I'm expecting that that's how it's going to sound now.

In the focus group interview, Amanda presented video game music axiomatically: most of the music behaved as expected “because of how it is.”

A lot of the ones we listened to, um, had very pastoral, like peaceful settings to them, which, you know, immediately made me think of just a town, you know, somewhere where there's not action going on, where you're able to just walk around and do things. Um, and it's just, I don't know, video games, I think they tend to just be very, um, systematic in the way they approach certain cues. Like, for example, if in the Final Fantasy, before the screen went black, just that sound effect signified to me that we were about to go into something different. So I don't know, just in general they seem to share a lot of similarities.

MUSIC DESCRIPTORS

Elements such as instrumentation, timbre, and tempo may assist in connecting video game locations to real world places. Heather notes that, in her specific experience with the game *Dragon's Dogma*, the usage of flute evokes a medieval city setting, while wind chimes evoke a feeling of being by the sea. Meanwhile, tracks that are higher in tempo were interpreted by several participants as conveying "intensity." Boris and Amanda both used "intense" to describe tracks that had higher tempos and frenetic energies, usually in a combat scenario. Bill described the Quarantine Chronicles from the focus group interview by identifying different elements (e.g. tremolo cello and tritones) that contributed to an overall feeling of "something's going down here." Bill specifies that his work as a composer informs how he listens to video game tracks for specific evocative elements. Indeed, many of the musician participants used the word "analytical" to describe their listening habits to all music, not just video game music.

Antonio gave a specific example that relates to both tracks and cues. He drew a stylistic distinction between the realistic sound palette of *Mortal Kombat* and the more stylized anime sound palette of *Street Fighter*. Antonio described the music of *Mortal Kombat* as "ambience", where the sounds are "out in front," whereas the cues and tracks of *Street Fighter* are more mixed.

They're both similar, but also very different...and I guess it's just the nature of what each game is telling in each like universe. With *Street Fighter*, all of the sound effects are almost animated, dish style, you know, they're out there they're meant to inform you of what's happening with every punch, every fireball, every all that, but it's never like brutal. It's never visceral. It's loud enough and distinct enough to let you to inform you what's happening almost like in any enemy.

Right. Mortal Kombat: it's out in front way more than any of its music, but it's done. So in a way where it is informing you, that bones are breaking, that spines are shattering, that blood is being spilled everywhere. Right? So more than the music, the sound effects of Mortal Kombat inform identity, way more than sound effects of most other fighting games.

In this example, Antonio differentiates purely on sound between different varieties of violence of two games in a genre where fighting is in the name. In this case, not only is the sound itself a differentiating factor, but the mix between the two as well.

From the qualitative data analysis, kinesonory and affect arose as the two modalities through which participants interacted with and learned from game sound. Through kinesonory, participants learned about their avatar state (*Super Mario Bros.* star power), changes in location (differentiations between “forests,” “towns,” and “dungeons”), gameplay intensity (“Thunder” and “Rain” combat modes in *Fire Emblem: Three Houses*), and immediate hazards (*Call of Duty* enemy combatant locations given away with footstep sound cues). Through affect, participants learned how they should be feeling about certain in-game moments (*Undertale*'s impactful story and the effect of its music on Kareem and Antonio) and various music elements (the Quarantine Chronicles from *The Last of Us* utilizing tremolo cello to evoke a sense of foreboding as described by Bill), contextualized by past video game experiences (towns often sound pastoral, so pastorality in music evokes a town, according to Boris)

In the next chapter, I will discuss the results of the data in context of learning and music education, suggest implications for the music education field, and offer suggestions for further research

CHAPTER FIVE

Side Quests & Sequels; Implications & Suggestions for Future Research

After second grade was finished and summer break began, my friends and I had time to do just about whatever we wanted. There were some games we wanted to play, both video and non-video, that we just couldn't do while we were going to school, so they became like our postgame side quests, all the while preparing for the next challenge that awaited us in the sequel: third grade.

At the end of a campaign, there is usually a final challenge to test the mettle of the player; often, this final challenge involves stopping the main villain's master plan. Once this final challenge is cleared, the player has completed the game. However, many games offer optional quests and challenges that are not required to clear this final challenge. These optional challenges are called "side quests," and while they are usually tangential to the game's story, they may offer additional insights or flesh out seemingly incomplete narratives within the larger story. Once they complete the side quests and final challenge, players must wait for a sequel to be released before they may continue any further.

In this chapter, I will offer the side quests and sequels of my research study: discussion and implications for the music education field and suggestions for future research and practice. Many successful video games have spawned series and franchises in which the successes and failures of prior entries informs the development of future entries. The landscape of research is no different. I place this document firmly in the middle of a research "franchise" in that it is a work informed by what came before it and helpful to those who may follow.

DISCUSSION

As stated in the previous chapter, participants primarily constructed meaning from game sound through kinesonic and affective means. They acquired knowledge and built skills both inside and outside the game world through their perceptions and enactments of game sound. The differences between in-game skills (e.g. Antonio knowing when to tap the circles in *Elite Beat Agents* or Jeb avoiding enemies by hearing their footsteps) and their corresponding out-of-game skills (rhythm and spatial awareness, respectively) were quite distinct. Participants' accounts of their interactions and meaning-making were largely based within the magic circle. As a result, we may conceptualize the magic circle as not only a construct of play, but also a location of learning, or a learning space.

According to Huizinga (1938/1955), the rules that apply inside the magic circle of play are different from those that apply in other facets of everyday life (e.g., work and study). In order to successfully play a specific game, players must learn these rules as quickly as possible. Thus, they are immediately and extrinsically motivated to learn, becoming active participants in their own learning experience. In her book "Teaching to Transgress," bell hooks (1994) asserts that this kind of active contribution from all learners is an important facet of the educational experience:

To begin, the professor must genuinely *value* everyone's presence. There must be an ongoing recognition that everyone influences the classroom dynamic, that everyone contributes. These contributions are resources. Used constructively they enhance the capacity of any class to create an open learning community. (pg. 8)

During the act of play, inbuilt rules and boundaries are paramount to a continued place within the magic circle. In collaborative video game play, violating a rule (such as cheating, or activities that are agreed upon by the larger community to be “cheap”) may result in a social or mechanical ejection from the game (Consalvo, 2009). Therefore, rules and boundaries are the most utilitarian information in play and are prioritized at the onset. What other kinds of information may players learn after they conquer the rules?

According to the participants, information such as environmental textures (e.g. Kareem’s account of the metallic coin sound and Boris’s account of the skidding on dirt sound), level of danger (e.g. Amanda’s example of the bridge in *Shrek 2* and Heather’s example of the city in *Dragon’s Dogma*), completion of a quest or task (e.g. Heather’s experience playing *World of Warcraft*), and even larger scale aesthetics and style (e.g. Antonio’s delineation between the realistic sounds of *Mortal Kombat* and the exaggerated cartoon-esque sounds of *Street Fighter*).

The magic circle’s distinction from the “real” allowed the participants to consider a broad spectrum of affective possibilities. One participant offered the possibility of an “in-game marriage, but with swords” as a possible setting for Town Theme from *Final Fantasy IV*. This is likely not a setting that they would have envisioned in their regular life. The affective power of music specifically is widely accepted (Dissanayake, 2015) but the expansiveness of possibility within the magic circle multiplies that power.

IMPLICATIONS

Wiggins and McTighe (2011) assert that the ability to transfer learning to new contexts represents deep understanding. Can this expanse of learning possibility within the magic circle transfer outside the magic circle and into the “real” world? Antonio

presented an account of a friend of his that learned guitar and formed a band after playing *Guitar Hero*. As the title suggests, *Guitar Hero*'s gameplay involves using a controller modeled after a guitar to “play” (in multiple senses) in a rock band in the game world. Players may enhance their rhythm skills through playing *Guitar Hero* (Keeler, 2020), but other, perhaps less obvious skill transfers remain to be seen. In the following discussion, I will conflate “players” and “learners” as one and the same, as I have established that, in this study, players of video games do indeed become learners.

Kinesonarity as a modality for learning requires a relation of sound and action. A learner requires a certain amount of agency to be able to negotiate possible actions and discover sonic feedback. Inversely, learners may create sound and either discover active feedback in others or react to sounds themselves. In a computer-mediated setting, “others” may be any manner of “computer-controlled opponents and situations” (Wolf, 2008) and other players in multiplayer settings. The computer-mediated setting in this research was video games, but other contexts could include virtual spaces that are not explicitly aimed toward play, such as webinars, virtual meetings, and Learning Management Systems (e.g., Seesaw, Canvas). However, computer-mediation is not achievable in all settings of learning; in physical learning spaces such as classrooms, company meetings, and professional development seminars, kinesonarity may be more of a team effort; the lack of programmed sounds and actions requires other learners or the facilitator to simulate the factors that create synchresis. Assigning one learner to the action and another to the sonic feedback is an imperfect and analog way to program, but nonetheless may sufficiently simulate the computer-mediation that kinesonarity requires to function as a learning modality. In a high school ensemble music classroom, this may

take the form of a literal video game being played by one student (the action) and the rest of the ensemble collaborating to provide cues and tracks for their action (sonic feedback). In this case, the ensemble is communicating to the player about the nature of their actions (a flutist may accompany the jump of a small character with a trill while a percussionist might use a set of timpani to reflect the heft of a large character hitting the ground). However, the action does not have to be a video game; the action may be something else entirely. We can even conceptualize the action of clapping or cheering for a performance that has been enjoyed by the audience as a form of kinesonic synchresis. Facilitators and other peers can use sonic feedback (such as clapping) to react, reinforce, or discourage a learner's behavior and work (in this case, a musical performance).

Perhaps more prescient to music teachers in particular is the second modality of game sound learning discussed in Chapter 4: affect. Music teachers are familiar with teaching *about* affect in music, but teaching *through* affect is decidedly different. Participants drew individualized affective conclusions from music; when listening to “Snowdin” from *Undertale*, some described the track as “happy” and reminiscent of a farm while others suggested that the “world was about to fall apart” and that the location may have been “the last peaceful town before something goes wrong.” Emotions, moods, and aesthetics are just a few examples of affective information that participants learned through sound alone. While divergent responses complicate any sort of empirical conclusions, I assert that based on Grimshaw & Nacke's (2011) definition of affect as “gut reactions to stimuli,” affective learning in video games is a process not necessarily defined by the result. Therefore, a diversity of responses simply indicates that players can construct a variety of meanings from their experiences. In his constructivist model of

education, the French psychologist Piaget (1971) theorized that learners construct their own meaning from their experiences that may or may not align with the desired result of the teacher. Teachers and facilitators should consider affective learning within games as a constructivist experience given the possibility of varied responses. Participants in the current research constructed divergent meanings around a converging stimulus, which facilitated a discussion in the focus group regarding what in the music caused these constructions. Not only did participants learn about various emotional and aesthetic game elements from music, but they also analyzed the music from the affective perspective through their discussion.

For facilitators of learning, kinesiornity and affect are facets of learning spaces that may be transferred out of the magic circle of play and into more conventional learning environments. Through the cause-and-effect of kinesonic synchresis and the constructivist possibilities of affective learning, teachers and facilitators may transform their conventional spaces into unconventional ones in which learners construct their own meanings and negotiate their own actions and reactions.

SUGGESTIONS FOR FUTURE RESEARCH

The purpose of this phenomenological research study was to explore participants' experiences with learning through sound in video games. The paradigm of phenomenological research requires a multiplicity of perspectives. As a qualitative study, results we cannot generalize to other populations; however, more perspectives would enrich our understanding of the phenomenon. As most of the participants in this study were formally trained in music, others should replicate this research with more non-formally trained people. In Chapter Four, I asserted that the musical experience of a

participant contextualized their interaction, perception, and ultimately learning with/from sound. Therefore, this area of inquiry would benefit from perspectives of musicians from other musical traditions as well as more “non-musicians.” Additionally, as a departure from this study’s focus on adult learning, others may conduct research with the perspectives of younger learners to contextualize this research for K-12 educators.

I designed this study as a pilot to uncover emergent themes in participant experiences. Considering the findings of this research, I propose a subsequent study that explicitly uses these themes of kinesonarity and affect as a framework to design a learning experience. Conducting a quantitative study in which the researcher uses a pre- and post-test to measure learning outcomes in such an experience can generate further insights into how kinesonarity and affect may be harnessed as learning contexts. As Bourgonjon et al (2013) suggest, educators need expository information before successfully implementing something new such as game-based learning. A quantitative experiment looking directly at a magic circle of learning in relative real-time (as opposed to the qualitative self-reflection that generated this study’s data) may fulfill that need for exposition, as such an experiment can be replicated by those interested in fostering the non-traditional learning space of video game sound in their own settings.

CONCLUSION

Lucie, as an adult, started each chapter of this document reminiscing about how she contextualized her school experience as a video game, which was a positive procedural force in her life as stated in Chapter 1. Through this reframing, she placed negative experiences, such as math class, within something she enjoyed. Meanwhile, even though all of the musician-identifying participants reported burnout regarding their

own collegiate music studies, they shared an exuberance for video game music that was untouched by said burnout.

Can educators, teachers, and other kinds of learning facilitators do the same with the learning spaces of which they may be in charge? Video games are diverse in structure, genre, and player experience, and are not monolithic. However, we may create possible alternative learning experiences by considering some examples of video games as frameworks for these experiences. An administrator or teacher leading a professional development for their colleagues may facilitate kinesonic synchresis to aid the learners in exploring a new software or tool. A church choir director may facilitate musical analysis and subsequent interpretation decisions among members based on the principles of affect within video games. A collegiate theory professor may do the same with their college-level theory course.

The “franchise” of video game sound learning is not on the level of *Super Mario Bros.* quite yet. However, I have completed the main campaign and all side quests of this iteration of the franchise. As both a learner and facilitator, I am looking forward to playing the next one.

APPENDIX A

Individual Interview Questions

1. What are your prior experiences with video games?
2. What is your prior experience with music?
3. How do you think your experience with music affects how you perceive and interpret video game music?
4. When we did that listening activity in the focus group interview, what were some things that other people said that surprised you or you generally hadn't thought of?
5. Can you think of moments in your past experience gaming where sound and music told you something specific about the game world both ludically (specifically, how the game is functioned or played) or narratively (characterization, key story moments, environment?).
6. How do you interact with game sound? How does game sound interact with you?

APPENDIX B

Focus Group Moderator Guide

Prior to opening Zoom, open Super Mario All-Stars in a SNES emulator in a separate window.

INTRODUCTION

“Let’s have everyone introduce themselves. Tell us your name, a little bit about yourself, and if you feel comfortable here, share your experiences with both music and video games”

WARM-UP ACTIVITY

“First, I’m going to share my screen and play three different video games in real time for a few minutes each. I will prompt you with questions in the chat as we go, so be ready to type some responses. We are typing so that we are not talking over top of the audio we are trying to listen to”

Ask participants to turn off video during screensharing to preserve bandwidth for everyone

Share screen: SNEX9X window (check computer sound on)

Super Mario Bros. (World 1-1)

- “The background music is a TRACK and the sound effects are cues”
- Prompt 1: “Describe, in your own words, in the chat all the sounds you hear, both tracks and cues, and what they tell you about the game, the environment, what I should do next, or what’s happening currently.”
- Fast forward to when the in-game timer is a little over 100 seconds remaining
- Prompt 2: “When time runs short, what happens to the track? What does that tell you?”

Super Mario World (World 1-1)

- Repeat of Prompt 1 (see above)

Super Mario World (World 1-2)

- Play until Mario hatches Yoshi
- Prompt 3: “When Mario gets on Yoshi, what changes in the track? What does that tell you as a player and/or a viewer?”

Final Fantasy V (<https://youtu.be/Z0RtcAi94bQ?t=1812> open this link, then switch share screen to the YT window)

- Pause at 30:16 timestamp: “What does that sound cue tell us? What might be coming next?”

Un-share screen, then just share just computer sound.

“We’re going to listen to excerpts of 6-8 tracks from different games. Tell me what the music makes you think of in the chat and why. Ex: In what kind of location would this play? What genre of game would you expect this track to appear in? If you were playing, would this make you feel tense? Relaxed? In danger? Encouraged? Heroic?”

Play each video without divulging the title or the game from which the track originates.

Battle Theme from *Final Fantasy IV*:

https://www.youtube.com/watch?v=_nh5QcbYvGM

Kakariko Village from *The Legend of Zelda: Ocarina of Time*

<https://www.youtube.com/watch?v=8gbpIbQ5vvk>

The Quarantine Chronicles from *The Last of Us*

<https://www.youtube.com/watch?v=q5H0pkxFPkw&list=PL8ewBDH5ZkrUqmqzDJvyIPoUcM8qLsJ2bZ&index=1>

Battle from *The Legend of Zelda: Ocarina of Time*

https://www.youtube.com/watch?v=9DTV54w1_oc

Snowdin from *Undertale*

<https://www.youtube.com/watch?v=z6LmMCuGjfA>

Home from *Undertale*

https://www.youtube.com/watch?v=5_E_y1AWAfc

Town Theme from *Final Fantasy IV DS*

<https://www.youtube.com/watch?v=XiJc0df-Fxk>

“If everyone wants to turn their video back on, we’re going to move into the more traditional ‘interview’ part of this focus group interview, and I’m going to ask you a few questions based on your experience today, but feel free to use some of your past experiences in your responses and discussions as well”

Question 1: “What were some things that the sound cues communicated to the player in the three games you saw gameplay footage of today? What were some of the characteristics that helped that communication?”

Question 2: “What were some things that the track communicated to the player? What were some of the characteristics that helped that communication?”

Question 3: “What parts of the game world (setting, story, interface, controls, characterization) were taught to the player using sound? Were there any parts of the game world that could have been taught or explored using sound?”

A P P E N D I X C

List of video games mentioned

Games are listed in chronological order by release date.

- Mario franchise (1981-2021) – Nintendo
- The Legend of Zelda series (1986-2020) – Nintendo
- Dragon Quest series (1986-2020) – Square Enix
- Final Fantasy series (1987-2021) – Square Enix
- Pokémon series (1996-2019) – Game Freak
- Halo series (2001-2007) – Xbox Game Studios
- Call of Duty (2003) – Activision
- Second Life (2003) – Linden Lab
- Donkey Konga series (2003-2005) – Nintendo
- Shrek 2: The Game (2004) – Activision
- World of Warcraft (2004) – Blizzard Entertainment
- Guitar Hero series (2005-2007) – RedOctane
- Elite Beat Agents (2006) – iNiS
- Rock Band series (2007-2017) – Harmonix
- Mass Effect series (2007-2017) – BioWare
- Dragon Age series (2009-2014) – BioWare
- Def Jam Rapstar (2010) – Terminal Reality
- Minecraft (2011) – Mojang
- Dragon's Dogma (2012) – Capcom
- Depression Quest (2013) – Zoë Quinn

- The Last of Us (2013) – Naughty Dog
- Quantum Spectre (2013) – EdGE@TERC
- Undertale (2015) – Toby Fox
- Fortnite (2017) – Epic Games
- Musa (2018) – CASIO Italia
- Super Smash Bros. Ultimate (2018) – Namco
- Beat Saber (2019) – Beat Games
- Fire Emblem: Three Houses (2019) – Intelligent Systems
- No Straight Roads (2020) – Metronomik
- Spumone (2021, updated) – Brianno Coller
- Cha-Luva Swing Festival (unreleased)

APPENDIX D

Consent Form

Consent to Participate in Research

Identification of Investigators & Purpose of Study

You are being asked to participate in a research study conducted by Leonard Grasso from James Madison University. The purpose of this study is to explore the experiences of people who play videogames (players) learning from game sound. This study will function as the basis for the researcher's capstone thesis project, required to submit and defend for the completion of the Masters of Music degree

Research Procedures

Should you decide to participate in this research study, you will be asked to sign this consent form once all your questions have been answered to your satisfaction. This study consists of a focus group interview with all participants (ranging from six to twelve participants total) as well as an individual interview to be scheduled after the focus group interview takes place. All interview will take place over Zoom. During the focus group interview, you will be asked to observe and comment on the Primary Investigator playing various videogames, either in text chat or verbally. After the videogame playing session is concluded, the focus group will be asked several reflective questions. During the individual interview, you will be asked to provide answers to a series of questions related to experiences with videogames and possible reflections on the focus group interview. Your interviews will be audio/video recorded.

Time Required

Participation in this study will require three cumulative hours of your time.

Risks

The investigator does not perceive more than minimal risks from your involvement in this study (that is, no risks beyond the risks associated with everyday life).

Benefits

While there are no direct benefits to you as a participant in this study, there will be a benefit to the music education field by contributing to the games-in-education discourse in a new way.

Confidentiality

The results of this research will be written in a thesis document to be presented to several faculty readers. The results of this project will be coded in such a way that the respondent's identity will not be attached to the final form of this study. The researcher retains the right to use and publish non-identifiable data. While individual responses are confidential, aggregate data will be presented representing averages or generalizations about the responses as a whole. All data will be stored in a secure location accessible only to the researcher. Upon completion of the study, all information that matches up individual respondents with their answers, including all recordings, will be destroyed.

Participation & Withdrawal

Your participation is entirely voluntary. You are free to choose not to participate. Should you choose to participate, you can withdraw at any time without consequences of any kind.

Questions about the Study

If you have questions or concerns during the time of your participation in this study, or after its completion or you would like to receive a copy of the final aggregate results of this study, please contact:

Leonard Grasso

Dr. William Dabback

School of Music

School of Music

James Madison University

James Madison University

grassola@jmu.edu

dabbacwm@jmu.edu

Questions about Your Rights as a Research Subject

Dr. Taimi Castle

Chair, Institutional Review Board

James Madison University

(540) 568-5929

castletl@jmu.edu

Giving of Consent

I have read this consent form and I understand what is being requested of me as a participant in this study. I freely consent to participate. I have been given satisfactory answers to my questions. The investigator provided me with a copy of this form. I certify that I am at least 18 years of age.

I give consent to be audio/video recorded during the focus group interview and my individual interview. _____ (initials)

Name of Participant (Printed)

Name of Participant (Signed)

Date

Name of Researcher (Signed)

Date

APPENDIX E

Recruitment Email for Musicians

SUBJECT: Videogame Sound Study seeking participants

Hello,

I am a second year masters student in the Music Education program here, and I am seeking participants for my study entitled “Videogame sound as educational space; a qualitative inquiry.” I seek to explore experiences around music/sound and learning inside videogames. If you have played a videogame before, I would love for your participation! Even if you don’t consider yourself a “gamer,” I am still interested in your perspective. Participation would include one focus group interview and one individual interview, taking about 2-4 hours of your time total.

If you are interested in participating and/or have further questions, please email me at grassola@jmu.edu.

Thanks,

Lenny Grasso

APPENDIX F

Recruitment Email for Gamers

SUBJECT: Seeking participants in research on game sound

I am seeking participants for my study entitled “Videogame sound as educational space; a qualitative inquiry.” I seek to explore experiences around music/sound and learning inside videogames. If you have played a videogame before (which I would assume you would have based on your presence here), I would love for your participation! The study is around sound and music, but if you don’t consider yourself a musician, I am still interested in your perspective. Participation would include one focus group interview and one individual interview, taking about 2-4 hours of your time total.

If you are interested in participating and/or have further questions, please email me at grassola@jmu.edu.

Thanks!

Lenny Grasso

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