

7-2020

## Sonic Rhetoric and Meaning Making in Video Game Sound Design

Adam DeRoss  
*Nova Southeastern University*

Follow this and additional works at: [https://nsuworks.nova.edu/hcas\\_etd\\_all](https://nsuworks.nova.edu/hcas_etd_all)



Part of the [Digital Humanities Commons](#), and the [Rhetoric and Composition Commons](#)

## Share Feedback About This Item

---

### NSUWorks Citation

Adam DeRoss. 2020. *Sonic Rhetoric and Meaning Making in Video Game Sound Design*. Master's thesis. Nova Southeastern University. Retrieved from NSUWorks, . (20)  
[https://nsuworks.nova.edu/hcas\\_etd\\_all/20](https://nsuworks.nova.edu/hcas_etd_all/20).

This Thesis is brought to you by the HCAS Student Theses and Dissertations at NSUWorks. It has been accepted for inclusion in All HCAS Student Capstones, Theses, and Dissertations by an authorized administrator of NSUWorks. For more information, please contact [nsuworks@nova.edu](mailto:nsuworks@nova.edu).

---

# Thesis of Adam DeRoss

Submitted in Partial Fulfillment of the Requirements for the Degree of

## Master of Arts Composition, Rhetoric, and Digital Media

Nova Southeastern University  
Halmos College of Arts and Sciences

July 2020

Approved:  
Thesis Committee

Thesis Advisor: Melissa Bianchi, Ph.D.

Thesis Reader: Mario D'Agostino, Ph.D.

Program Reviewer: Juliette Kitchens, Ph.D.

Sonic Rhetoric and Meaning Making in Video Game Sound Design

A Thesis

Submitted in Partial Fulfillment of the

Requirements for the Degree

Master of Arts in Composition, Rhetoric, and Digital Media

Adam DeRoss

Halmos College of Arts and Sciences

Department of Communication, Media, and the Arts

Nova Southeastern University

July 2020

© 2020 by Adam DeRoss

All Rights Reserved

Halmos College of Arts and Sciences  
Department of Communication, Media, and the Arts  
Nova Southeastern University

We hereby approve the thesis of

Adam DeRoss

Candidate for the degree of Master of Arts in Composition, Rhetoric, and Digital Media

15 July 2020

Date

Melissa Bianchi (e-sig.)

Melissa Bianchi, Ph.D.

Assistant Professor | Thesis Advisor

15 July 2020

Date

Mario D'Agostino (e-sig.)

Mario D'Agostino, Ph.D.

Assistant Professor | Thesis Committee Member

ACCEPTED

15 July 2020

Date

Juliette C. Kitchens (e-sig.)

Juliette C. Kitchens, Ph.D.

Associate Professor | Director of Graduate Studies

Department of Communication, Media, and the Arts

Halmos College of Arts and Sciences

Nova Southeastern University

## TABLE OF CONTENTS

	Page
Introduction.....	1
Literature Review .....	4
The Development of Game Sound .....	16
A Shift in Design Values .....	16
The History, technology, and Culture of Game Sound .....	17
Analysis .....	24
Dynamic Sound in <i>Banjo-Kazooie</i> and its Implications for Sonic Rhetoric.....	24
Making Connections Through Sonic Details and Player Performance .....	33
Conclusion .....	50
References.....	53

## Abstract

This thesis examines the rhetorical impact of sound in video games from an interdisciplinary perspective. By synthesizing game studies research with rhetorical theory, the thesis puts the works of notable game scholars, such as Karen Collins, Ian Bogost, Iain Hart, and Paul Cairns in conversation with research on sonic rhetoric by scholars such as Tanya K. Rodrigue et. al and Steph Ceraso. The thesis uses a ludomusicological lens to analyze several video games in which sound and music are heavily emphasized elements within the gameplay experience, such as *Banjo-Kazooie* (Rare, 1998) and *Night in the Woods* (Infinite Fall, 2015). Through the analyses, the thesis argues that sound in these games contributes to their immersive and engaging game worlds as well as their rhetorical storytelling. The thesis also illustrates how game sounds (or a lack thereof) can function as symbolism and metaphor, help players express themselves through interactivity, and support the medium's other narrative elements. Finally, the thesis describes the broader implications of its arguments for game studies and rhetorical research, including how sonic rhetoric can function with or against other modalities in games and how sound might be used to engage audiences in other forms of interactive media.

## Introduction

Since the inception of the medium in the early 1970s, video games have taken many forms and were originally perceived as innovative ways to entertain or facilitate friendly competition. While players today still view video games in this way, the industry has also expanded rapidly due to swift technological advancement, an increased focus on narrative, the formation of various large and independent game development companies, and an increased number of players, among other things. Game studies scholars follow these innovations closely, examining games' visual and procedural rhetoric as products of these developments. Despite these extensive studies, one aspect of game-centric scholarship remains relatively overlooked regarding rhetorical study: the use of effective sound design.

Specifically, sound design and music composition in games often take a back seat to visual, tactile, and procedural elements in both contemporary game scholarship as well as conventional game design. As stated by Chang et al. (2007), "To date, most developments in enhancing games have been involved with improvements to game visuals, with audio being tragically overlooked in favor of better graphics. A game's interactive elements are enhanced through the successful mating of graphics and audio" (p. 6). This enhancement of the overall experience of a game through audio is a significant one. In fact, further research and discussion on the subject can illustrate just how versatile and impactful game audio is. With an increasing pool of game developers finding interesting and creative ways to effectively implement rhetorically and narratively focused sound design, it is an opportune time for game scholars to further explore game audio.



Ludomusicology, the study of sound and music in video games, has worked to address some parts of this oversight. There is still, however, much room for expansion. A specific demand for that expansion is indicated by the January 2020 launch of *The Journal of Sound and Music in Games*. Furthermore, recent game developments and releases demand examination through a ludomusicological lens given their innovations in designing and implementing sound. Extended conversation about sound in games can lead to positive developments for the various demographics that consume them.

My project connects ludomusicological research to rhetoric and narrative meaning making. Modern games use strong writing, character development, overarching themes/symbolism, and striking visual design to further their narrative affect and rhetoric. While presenting rhetoric visually in video games is commonplace, presenting rhetoric aurally is quickly becoming a significantly more prolific practice in rhetorically charged game releases. Taking a ludomusicological approach to studying how game rhetoric can generate meaning for players reveals a host of new research opportunities in game studies and rhetoric studies. This thesis argues that sound design and music composition can play a significant role in making these elements of video games especially nuanced and effective for players.

In this thesis, I explore specific examples of game sound that rhetorically impact game narratives and affect players' experiences with them. Some examples I consider include symbolically significant leitmotifs,<sup>1</sup> instrument choices highlighting character motivations, players performing actions as a means to directly influence a game's auidial

---

<sup>1</sup> This refers to specific short melodies or rhythms that are often repeated throughout a score to refer to specific characters or narrative concepts in game scores.

components, and the significance of aural symbolism in providing a complete narrative experience in games. Analyzing these rhetorical elements of carefully crafted sound design in games reveals a wealth of insights into the profound effects sound can have on a narrative and rhetorical game experiences. This thesis, explored by a player that is affected by game sound, provides perspective on the ways in which game sound matters.

## Literature Review

As the technological landscape of the entertainment industry continues to shift, consumers and scholars alike are increasingly aware of the role multimodality plays in our everyday media. Multimodality dictates how we interact with and understand not only the procedural, technological, mechanical, and developmental elements of video games, but their compositional elements as well. Much of the information in video games is conveyed to a player through on-screen graphics or animations. However, games use other sensory elements to further their narratives and create rhetorical meaning making opportunities for their players. For example, a major consideration for game developers is whether to include audible voice-acting for characters in a game. Many games are often praised for the quality of their narrative writing, but there are countless examples of games that are well-written that are still received poorly by players if the voice acting is not up to par. Conversely, there are games that have no voice acting (either by choice or by technical and financial limitations) that are widely praised for the quality of their narratives. However, these instances are often largely determined by intentional composing techniques.

In this study, exploring the aural components of games, specifically through a ludomusicological lens, is possible due in large part to the body of work and research on sound in games conducted by Karen Collins. Collins, an associate professor of Digital Arts and Communication and Experimental Digital Media, is an accomplished ludomusicologist who has experience designing game sound, directing a documentary on the history of game sound, and publishing numerous referred works on ludomusicological concepts, many of which are referenced in this study. Some of the essential

ludomusicological elements that Collins addresses are the history of game sound, music theory applications, health impacts of game sound, and game sound technology affordances or limitations. However, the major concepts from Collins' repertoire that this study will draw on are the aspects of sound that are dynamic, procedural, immersive, affected by player performativity, and rhetorical. Dynamic, procedural, and interactive sound are essential components of sound design in games, regardless of their rhetorical intent.

Many fields already recognize that sound is an important component of media; however, the rhetorical implications of sound run much deeper if we only stop to consider them. Gunn et al. (2013) use the example of Franklin Delano Roosevelt's 1941 declaration of war speech to highlight how sound can be a crucial component of both the identity and function of media. They observe that, despite the existence and public accessibility of an audio recording of the speech in its entirety, we commonly elect to read it rather than listen to it. Gunn et al. argue that the words of the speech are not the only important part of it. In fact, the sonic context of the speech may hold an even greater rhetorical significance. A well-written speech is only one component of great public speaking and, in the case of FDR's speech, his "incredibly slow cadence... Attempted to reassure people about their own safety and comfort them with the tone of restrained anger and determination" (p. 488). This impacts the overall meaning of the speech more than text could ever do on its own. The rhetorical conclusions drawn from these elements would be impossible to unearth through a written transcript of the speech alone. We can apply this very same concept to sonic rhetoric in video games through a ludomusicological lens. While many developers may be concerned with game visuals,

narratives, and mechanics first and foremost, having a well-planned auidial component not only creates meaning on its own but supplements the other components of the game. Much like the speech is improved with an added auidial context, the emotional impact of a game's narrative or the overall symbolic meaning of a specific rhetorical point can be punctuated by effective voice acting or emotionally appropriate music. However, the mere presence of sound, or lack thereof, is not enough to strengthen a game's rhetorical appeal. Doing so requires composers of game sound to use auditory elements in unique, deliberate, and impactful ways that can improve a player's meaning making experience. Examining the various ways that composers can do this and exactly how they impact the rhetorical delivery of a game is a major consideration for this thesis.

Before discussing the role sound plays in the rhetoric of video games, I will review contemporary scholarship about the rhetoric of games that inform this thesis. For example, the concepts of procedurality and procedural rhetoric in games developed by scholar and game designer Ian Bogost support my analyses of how sound operates in games. Bogost (2010) describes procedurality as players following a specific set of rules or procedures set by game developers when playing a game. Bogost acknowledges that procedurality is often received negatively by game scholars, as it implies that a strict set of rules limits player expression. However, Bogost argues that these imposed rules offer a unique form of expression and vehicle for narrative reception by the player. An example Bogost uses to illustrate this is the 2001 video game *Animal Crossing*. The game is a social simulator that places players in the role of a newly moved in resident of a village inhabited by anthropomorphic animals. The game feature a relaxing yet repetitive loop of gameplay, with the player participating in activities such as fishing and catching

bugs to earn money, which they can then use to purchase clothing and furniture or pay off the mortgage on their house. Doing so will upgrade their house with more floor space, making room for more furniture purchases as well as an even larger mortgage sum.

Bogost states, “Animal Crossing deploys a procedural rhetoric about the repetition of mundane work as a consequence of contemporary material property ideals” (p. 268).

Bogost argues that, while the process of the game is inherently the same for all players, players do have a sense of freedom in expression within that process because they are able to connect with their character and the villagers and make up their own mind about whether the ability to socialize and express themselves through material gain is worth the mundane process needed to achieve it. Bogost’s framework of procedural rhetoric in games provides a basis for studying the rhetoric of gameplay procedures. While this perspective does not specifically account for the sound design or sonic elements of the game, my thesis builds on Bogost’s work by synthesizing his notion of procedural rhetoric with a ludomusicological approach to games. My analyses show how established game procedures and their rhetorics can be supported or subverted through sonic rhetoric.

The study of ludomusicology is crucial to understanding how game sound generates meaning for players. Iain Hart (2014) argues that research on ludomusicology should be approached in a manner similar to long-standing observations on musicology. He states that the way we view music in media should be evaluated to apply the same concepts in a ludomusicological context because video games offer numerous unique experiences and musical contexts through interaction and player engagement. Hart (2014) also states, the key to distinguishing between general rhetorical intent in video games and other forms of entertainment media is a game’s requirement for engaging interactivity:

“Video games require certain modes of active engagement on the player’s part that are beyond what is required by film viewers” (p. 276). The concept of player engagement is important to follow throughout this study, as it informs the intended impact of game sound on players. Depending on how game sound is implemented it may have a large impact on how players interact with the world or how invested they become in the narrative. A term that can be used to succinctly describe the idea of a player’s level of engagement with a game’s narrative and world is “immersion.”

Immersion is a key factor in influencing players’ experiences in a game world, especially through immersive sound. Immersion is often defined as how mentally involved the player is with the game world, and developers often emphasize immersion when designing for player engagement. As explored by Emily Brown and Paul Cairns (2004), immersion is “related to the realism of the game world or to the atmospheric sounds” (p. 24). Sound in games can make the game world more convincing or engrossing. If a player is exploring a forest, for example, including atmospheric sounds that the player might expect to hear in an actual forest, such as flowing water, animal noises, or the crunching of leaves under one’s feet plays a role in boosting player immersion. Keeping players engaged by convincing them that they are a part of the game world as much as possible is often a crucial consideration for game developers.

Engagement is a key reason as to why games are as successful and engrossing as they are, and why immersion innately prioritizes engagement. One of the main reasons people play games is to experience a different reality, or perhaps to escape their current one. Brown and Cairns (2004) emphasize that immersion is a crucial aspect of game design for player engagement, and the effectiveness of that immersion is directly

determined by the game's compositional elements. Brown and Cairns conclude that one of the key elements of effective immersion is an environment that drives the player to want to actively engage. One of the most effective ways to persuade players to engage in the game world is sound because players have to put effort into interacting with the game world by engaging with its visual and audial aspects at the same time (Brown and Cairns, 2004). Thus, the player feels immersed because the game requires them to engage with the world.

While game scholars such as Brown and Cairns have frequently touched upon player immersion, connections between immersion and ludomusicology remain sparse. Even so, immersive sound is a widely important focus for game developers in making their games engaging experiences for players as it helps form a complete and meaningful narrative for players. While immersion is achieved through a variety of modes, such as the visual and the tactile, sound not only provides important immersive qualities to games but also reinforces and supports other immersive components. Relying solely on the strength of a game's visual or verbal elements creates a less demanding atmosphere for the player, but using sound to reinforce these elements or adding sound as a fully immersive element on its own often goes a long way in facilitating player immersion, engagement, and rhetorical meaning in games.

A factor of sound that both contributes to its innately immersive qualities as well as highlights its versatility of applications is its multimodal and multisensory nature. One of the defining features of sound that sets it apart from the visual or tactile is its effect on a spectrum of physical and mental responses in human beings. In her 2014 article in *College English*, Steph Ceraso puts forth the unique concept of "multimodal listening."



Ceraso argues that listening is not an experience that solely affects our ears. Rather, it is an “expansive, multisensory practice” (p. 104). Sound is both heard and felt through its vibrations and resonance. Ceraso uses the case of deaf percussionist Dame Evelyn Glennie, who feels her role in the music rather than hears it, to highlight that what we hear is not the full extent of sound’s effects. In this way, we can glean that multimodal listening is a method by which rhetorical delivery can be strengthened when designing audial components.

Just as sound can trigger physical responses as feedback to its waves, it can also trigger emotional and multisensory responses within us. When applied to a ludomusicological perspective, the practice of listening as a holistic and sensory experience benefits the concept of videogame immersion immensely. When applied to sound in general, multimodal listening is a practice that promotes a heightened awareness of contextual factors of the music. These factors can include location, medium, tone, rhetorical intent, emotional significance, etc. In the case of playing a videogame, a player is provided with an enclosed and engaging digital space in which they can apply multimodal listening practices to glean as much meaning from videogame soundscapes as possible. Beginning to associate certain sounds or musical pieces with specific characters, locations, actions, or narrative threads has a profound effect on player immersion. Hearing those same sounds or musical pieces in another context will automatically trigger an association with the game in question, showing that sound is a powerful tool in generating rhetorical meaning for players through unique and engaging sonic experiences.

Sound affords myriad rhetorical opportunities depending on how it is utilized by its composers. A few of these avenues are detailed by Tanya K. Rodrigue et al. (2016). The authors explore various methods of rhetorical delivery through sound including the use of music, sound effects, and sound interaction. The analysis of these concepts provided by the authors offers several insights that inform the thesis. For example, music is an often overshadowed source of rhetorical meaning-making compared to more visual or linguistic forms of rhetoric, especially in video games. Leaning on the concept of immersion, Rodrigue et al. cite Kyle Stedman's (2011) view on the meaning of music, which suggests that meaning in music depends on two factors: its audience and its interaction with its surroundings. Building on this viewpoint, this thesis explores the meaning making potential of sound when placed in the context of an engaging experience navigated by a player. Meaning making through sound already depends on the player to a significant degree, which is amplified by the player's "surroundings" in the digital context of a game world. However, while it is true that meaning is ultimately determined by the player, the composer of a game's music can also instill their own sense of meaning for players to discover through a variety of compositional methods and practices.

One such method that often yields effective results in meaning making through sound is the power of transitions. As explored by Rodrigue et al. (2016), sound often instills various thoughts and emotions in its audience depending on how it is composed. In this way, it can be an effective tool in guiding a player toward a certain line of thinking or source of rhetorical meaning making when paired with other elements of a video game, such as the narrative or visual context of a scene. Transitions in music can be gradual and subtle or sudden and jarring depending on what the composer intends. This

makes music a vehicle for shifting a player's perspective or cognition on the rhetorical themes of a game world in unique ways. As supported by Rodrigue et al., these factors form a rhetorical relationship between composers and players. Composers can instill meaning making in their own work that players may or may not pick up on, and players can choose to generate their own unique meaning from a game's sonic elements. Music and transitions, and the rhetorical roles they play in games, are explored in this thesis.

Sound effects often play second fiddle to the overall score of a piece of media's soundtrack; however, they are often just as, if not more so, important than musical compositions in increasing the believability of the depicted world. This is especially true in video games as sound effects are a form of sonic feedback for a player. When a player performs a specific action in a video game, they expect to hear a sound that believably correlates with what they have just done. Inaccurate or missing sound effects for even the simplest actions a player can take, such as running, jumping, or striking an enemy, can break a player's immersion in the game world. Thus, maintaining the attention and engagement of a player through immersive sound effects is paramount to ensuring that meaning making is possible. Beyond that, Rodrigue et al. (2016) also explore the emotional and symbolic power of sound effects. Just as the musical score of a game can influence a player's emotions, sound effects can emphasize and support sonic emotional portrayals, associate characters or game elements with specific emotions, or use the prevalence of a specific and unique sound effect as a rhetorical device that will become familiar to the player over the course of the narrative. As explored later in the thesis, sound effects in both *Banjo-Kazooie* (Rare, 1998) and *Chibi-Robo!* (Nishi & Moriyama, 2005) highlight rhetorical themes and further develop the personalities of many

characters in the game world. The expressive power of sound effects contributes to the staying power of sonic rhetoric in these ways.

While musical compositions and the clever use of sound effects can strengthen sonic rhetoric, the concept of sound interaction is what ties sonic elements in a piece of media together to create a lasting rhetorical impact. As explained by Rodrigue et al. (2016), sound interaction refers to the ways in which sonic elements interact with each other to achieve unique meaning-making experiences. However, there is an extra layer of sound interaction in the context of a video game as the player can actively engage and interact with sound through play. The authors touch on the concept of “acoustic meaning” referring to meaning generated by the audience based on the sonic elements provided to them in the context of a story world. Dominic Robson (2002) and Theo van Leeuwen’s (1999) claims that sonic experiences are richer when they are layered and that music exists along a continuum where it can take on a sense of both homogeneity and opposition, respectively. Regardless of where the sonic elements of a game fall on this continuum, the composer or sound designer of the game must not only think about how their compositions generate meaning on their own, but how they work together to influence meaning making on a larger scale. This is where concepts such as leitmotifs, explored in games like *Undertale* (Fox, 2015) and *Night in the Woods* (Infinite Fall, 2017), show that sonic rhetoric is a complex and meaningful rhetorical vehicle that is much more significant, both in games and in general, than one might think.

Another supplementary concept to ludomusicology and sonic rhetoric that supports sound interaction is player “performativity” and how it ties into the “musical experience potentials” contained within a game text, as described by Iain Hart (2014).

Performativity is defined by Hart as a simple way to describe a player expressing something through their actions, much like an actor would do on stage. With ludomusicology in mind, a player's actions often play a direct role in enacting some change or facilitating a form of interaction with the soundscape of the game that, in turn, attaches a certain amount of "musical potential" to the player's actions. This potential is the benchmark for determining the "player's interactive relationship to the music," or the specific musical experiences a player can have within the confines of the game's sound design. Some of these potentials are designed around players explicitly interacting with music to change the game's mechanics or the outcome achieved, while others offer performativity as a medium through which to further a narrative.

Players' interaction and engagement with the sound of a game world helps them generate their own meaning. However, as Hart (2014) states "There is much scope, however, for further study into the nuances of this approach... further study in these and other areas will continue to develop our understanding of how music makes play meaningful" (p. 290). The "nuances" that Hart describes could signify a variety of aspects of play. Hart's observation directly ties to the concept of interactive sound explored by Collins and how players' interactions with sound helps them generate meaning. Thus, if a player performs an action that results in an accompanying sound, that sound is an example of performativity and conveys some sort of meaningful information to the player. Examining the difference between diegetic/non-diegetic interactive sound in games and explicit interactive sound as literal performance in games is another component of this study.

Taking a ludomusicological approach to both well-established games as well as recent and indie publications can shed light on an often overlooked aspect of game studies. Rhetoric through sound can be observed in a multitude of mediums, but games offer a uniquely interactive and engaging approach to sound design. There is much to be explored in the realm of rhetorical intent, meaning making, and developer-player connections through the rhetoric and composition of sound design in games. This thesis will explore the developmental history and values of game sound design technology, as well as analyze various games that exemplify sound design concepts using Collins, Bogost, and Hart's frameworks. Specifically, my analysis will focus on dynamic scores, leitmotifs, and character development in *Banjo-Kazooie* (Rare, 1996) as well as the use of player performativity and rhetorically charged sound design in *Night in the Woods* (Infinite Fall, 2017). I chose these specific games because sound design in these games is a crucial component of the player experience to the point where neither game would be as engaging or rhetorically whole without it. I will introduce the concepts explored in these titles through various smaller examples found in games such as *Chibi-Robo!* (Nishi & Moriyama, 2005), *Electroplankton* (Iwai, 2005), and *Undertale* (Fox, 2015). Ultimately, my analyses of these games reveal how the creative use of sound design in games can expand our opportunities for enhanced player engagement.

## The Development of Game Sound

### A Shift in Design Values

The video game industry has rapidly expanded and changed over the past several decades. As a result, players and developers alike have experienced some shifts in the values they place in game design. Developing a video game is a process that is usually, in some part, intended to earn a profit for the development team. To balance profit with player satisfaction, game developers must consider several factors that affect gameplay experiences. Those factors have significantly changed over the course of video game history. Whereas the earliest games released were mostly developed for the sake of experimentation, competition, education, or general mindless fun, present releases generally place a much larger emphasis on story world immersion and rhetorical purpose according to popular sources. As Mike Chen (2017) states, “Storytelling in video games has come a long way since the days of ‘aliens have invaded, fight back’... This has been a gradual shift over the past twenty or so years, as narrative has changed from a blurb in a paper instruction manual to something that often comes up as a talking point in reviews.” Because of this shift in values, video game narratives now often focus on character development, increased player choice, game world history and context, significant narrative threads, the performances of their actors, and visual aesthetics. Chen explores some specific examples of games that give extra consideration for their narrative world-building, such as the player being caught up in a military conspiracy as Solid Snake in *Metal Gear Solid 3* (Kojima, 2004) or the painstakingly detailed and rich lore contained within the *Mass Effect* (Hudson, 2007) universe. The same sentiment is echoed by Dylan Warman (2018) in his article exploring how the quality of video game storytelling has

changed over the course of game history. Warman observes that, as games evolve with the ever-improving expanse of gaming technology, game narratives have started to take on traditional methods of storytelling such as those found in novels or films. As such, the idea of roleplaying or having a player actively engage with the narratives and characters presented to them is a much more commonplace consideration in game design.

As game developers focus more on narrative quality, it is important to explore how this shift is *expressed*. As multimodal media, games provide developers the affordance of experimenting with various combinations of visual, tactile, mechanical, procedural, verbal, and aural elements to achieve a complete narrative experience that is engaging for players. However, there are much fewer examples of studies focused on creative ways in which sound is rhetorically implemented into games than studies focused on the other aspects of game design, especially the visual and procedural. This study argues that sound can be just as, if not more so, expressive than other game design elements, both on its own and when combined with others. A ludomusicological study of games provides insight on how sound can affect the rhetorical intent of a narrative and how that narrative can provide a much more engaging and impactful experience for the player.

### **The History, Technology, and Culture of Game Sound**

It is important to consider the rapid development of game technologies in both the industry and player communities when examining the sonic rhetoric of games. One factor of this is the ever-expanding technological standards, both in hardware and software, that are presently available to game developers with each new technological generation. The term “next generation,” or “next gen,” has become a colloquial term in the video game



industry that describes the latest landmark in game platform technology. For a piece of hardware to be next gen, it is usually expected to exceed the previous generation in terms of processing power, hardware features (such as virtual reality capabilities or built-in Blu-ray players), internal memory, player connectivity, graphical limitations, etc. Additionally, next gen software that accompanies this new generation of hardware is expected to facilitate better graphics, richer and more ambitious story elements, novel gameplay mechanics, etc. Because of this expectation, generational leaps look much different today than they did a few decades ago. For example, the jump from a generation of mostly 2-dimensional games to 3-dimensional games in the mid-1990s compared to the jump from mostly hand animated character models to the shift toward the heavy use of real actors and motion capture from the mid-2000s onward. All these elements combined have made it more realistic for developers to fulfill much grander narrative goals through the medium than would be possible otherwise.

The history of the mechanical implementation of sound in games is important for understanding and analyzing games' sonic rhetoric. Briefly historicizing sound technology for games can provide some context for the technological and creative adaptations that have led to contemporary designs for game sound. In developing for early home video game systems, ranging from personal Microsoft Disk Operating System (MS-DOS) computers to the Nintendo Entertainment System (NES), developers had to work around the specific affordances of these technologies. To fit all the necessary data for a complete game on a small capacity cartridge, floppy disk, or CD-ROM, space for sound data was often scarce. As stated by Peter Peerdeman (2010), "In early game development, the space available for music and sound in games was very limited. Sound

directors had the task to get as much audible content out of as little bytes as possible” (p. 14). This often resulted in rudimentary and repetitive game sound effects and music. For example, many Atari 2600 cartridges used heavily compressed, looping melodies for the duration of the entire game or would forgo music entirely to accommodate sound effects for various actions the player could take. Even if game developers wanted to include ambitious sound design, the affordances of these technologies could not facilitate such plans.

Due to limitations in storage space, developers would eventually appropriate newer sound technologies in the form of more advanced sound cards. Sound cards marked an iconic era of game development that afforded developers the option to emphasize auditory elements alongside other components of the gameplay experience. Early home game consoles were built similar to home computers in that their hardware relied on various individual computer components that worked together. However, even with growth in sound card technology, these components were often comprised of a small circuit that was only powerful enough to process and replicate very simple, short patterns or sound bites. This posed a challenge for developers to implement engaging sound without getting overly ambitious. Even if they could find a way to expand the memory on their cartridges to fit more complex sound compositions, developers and players alike were affected by the limitations of sound cards. Because of the varying quality of computer hardware or systems that players would have in their homes, it was never guaranteed that a game would always sound the way the developers intended on every system. For example, if one player had a copy of a game for MS-DOS but another was playing the Atari ST version of the game, the two different copies would most likely

sound radically different in quality/clarity. It was not until the implementation of Musical Instrument Digital Interface (MIDI) sound composition that these issues would be largely rectified in game sound composition.

The beginning of the use of MIDI technology in composing game sound was an important development in sound technology that improved developers' ability to implement sound in games. As explained by Patrick de Arteaga (2018), MIDI was invented to unify compatibility between electronic instruments and provided a universal way to electronically carry data between different sources. While MIDI technology is currently used in various multimodal contexts, the most common data that MIDI carries is audio. MIDI made sound design much easier and more user-friendly for developers, as stated by Peerdeman (2010): "The big advantage of MIDI was that music could be composed and recorded without programming the synthesizer chips, in a format that was understandable for musicians as well... This greatly reduces the valuable disk space needed..." (p. 14). MIDI provides a way for music and sound to be composed, with real instruments or electronically synthesized replications of instruments and converted into digital data to be manipulated and stored. This advent of audio technology allowed game and system developers to record more ambitious compositions for video games. MIDI, along with upgrades to computer and game system hardware beginning in the late 1980s and extending through the 1990s, allowed sound to be a more prominent part of video games. Not only could game sound composers implement more complex, layered musical compositions, they could also consider how sound might provide a more immersive gameplay experience for players.

An effective way to conceptualize the progression of game sound technology and affordances is by examining the evolution of sound in a long-standing franchise. Looking at Nintendo's popular flagship, the *Super Mario* franchise, is a solid benchmark as over 200 titles featuring the character have been produced since 1981. The iconic *Super Mario* narrative about Mario rescuing Princess Peach from Bowser's clutches was first implemented in *Super Mario Bros.* for the Nintendo Entertainment System in 1985 and has not dramatically changed since its inception. However, through the rapid development of the industry and its technologies, Nintendo has been able to take this narrative and expand upon its narrative world over the series' lifespan. Recent *Super Mario* releases have explored narrative contexts such as Mario embarking on multiple planet-sized adventures through a vast galaxy in *Super Mario Galaxy* (2007) or having him travel to various real-world based locations on a mission to stop Bowser's forced marriage to Peach in *Super Mario Odyssey* (2017). With the expansion of narrative scope in games also comes the opportunity for the creative and unique implementations of sound within them. Whereas *Super Mario Bros.* used 8-bit tunes that were limited in scope by the capabilities of the NES audio chip, *Super Mario Galaxy* uses a fully orchestrated score to emphasize the grand scope of the game's adventure. *Super Mario Odyssey* also uses diegetic sounds that round out the game's environment. Thus, carefully considered and implemented sound design in games can supplement their visual and mechanical aspects, providing a wholly immersive and complete game world experience.

The soundtracks and original scores provided for game worlds also impact players beyond gameplay. For example, there is a large market for the purchase of game soundtracks. Special editions of games often include extra physical merchandise or in-

game digital content and sometimes these extras include physical or digital soundtracks in addition to steelbook cases, physical or digital art books, statuettes or models of characters or objects from the games, and wearable accessories. Even if a game does not possess any sort of physical or collectable edition, online platforms, such as Steam, sell game soundtracks and scores as purchasable downloadable content (DLC). This market suggests there is a demand for quality, and perhaps even effective, sound design in games. The popularity of video game music is also demonstrated by symphonic concert events that feature music from iconic franchises. MGP Live (2020) is a touring symphony that, according to their website, has performed over 100 live shows featuring music from the *Final Fantasy*, *The Legend of Zelda*, and *Assassin's Creed* series' over the past three years.

Sound technologies also afford players the opportunity to create music that draws inspiration from and expands upon the storied history of game world texts. For example, “chiptune” is a style of music making that directly intends to replicate the sounds of pre-MIDI, sound chip-based music prevalent in early game design. This style of music often utilizes a limited range of instruments and sounds while introducing modern elements and effects to achieve an overtly “retro” sound. Many artists, such as Anamanaguchi, create chiptune music to publish their own original ideas in a familiar format. Inspired by synthesized music composed for classic games, Anamanaguchi implements classic game system hardware in the composition of their tracks, playing to their audience's affinity for the chiptune genre. This effect is achieved with a digital MIDI interface that transcodes the audio performed with their physical instruments into sound chips from classic game hardware. This example shows how game music enhances the engagement of players

both in and out of the game world and unites them through an identifiable culture. The video game culture that players have built consists of various elements that provide a sense of identity, and game sound is one of the most identifiable and marketable aspects of this culture. Keeping this in mind, game studies demands an expanded conversation on game sound. By employing a focused and in-depth approach to the way we study and understand game sound, we can create completely unique experiences that cannot be achieved without specific aural affordances. Exploring these concepts opens up the scholarly field to numerous new discussions and discoveries that have the potential to reshape the way we study sound in video games. Additionally, the concepts explored through game sound design can be applied to sound design in general media, which would greatly expand the scholarly conversation on the importance and prevalence of sonic rhetoric in media. By emphasizing the importance and potential of a well-integrated audio component, rhetoric scholars can begin to implement and experiment with sonic rhetoric in various unique projects.

## Analysis

### **Dynamic Sound in *Banjo-Kazooie* and its Implications for Sonic Rhetoric**

Dynamic sound in games contributes to player engagement. As Hart (2014) suggests, video games require the player to actively engage in digital story worlds. While game narratives can be both linear and open-ended, both approaches to storytelling require the player to make decisions to progress. As suggested by Brown and Cairns' (2004) concept of player immersion, engaging with the sound that a game world provides is a way for players to become wholly invested in their actions within the game. Video game developers and story writers can also use a player's active engagement with game audio as an opportunity to make interesting rhetorical choices available to the player. Thus, game sound should be considered alongside game mechanics, visuals, and the quality of the narrative's writing when looking at a game's narrative rhetoric.

Conscious rhetorical design in the composition of a game's score can influence and enhance players' experiences. Moreover, specific game genres have iconic or distinguishing methods of sound design that enhance the content of the game. For example, sound plays an important role in fighting games to convey crucial information to the player quickly. Fighting games exist in many forms and contexts, ranging from two-dimensional one-on-one battles to three-dimensional multiplayer brawls. However, the basic structure of most fighting games is generally the same. They provide competitive environments for players to do battle with each other through avatars or "fighters." Generally, the player that does the most damage to the other and reduces their "hit points" to zero, wins. Many fighting games use unique sound cues for specific fighting actions. For example, successfully landing a hit on an opponent generally

triggers an appropriately meaty hit sound effect. Alternatively, if the opponent successfully guards against the attack a more subdued, muffled sound effect will play. Listening for these sound cues reinforces the on-screen action. This process is even more apparent when the player can actively influence the way sound works in a game through interactive and dynamic audio. The decisions made by game sound composers and designers are important to consider in the study of ludomusicology. Analyzing how much of the sonic rhetoric of a game comes from the composers or from the player is an important process in determining the game's meaning making ability.

Interactive and dynamic audio determine how players experience the game worlds they explore, both mechanically and narratively. When players interact with a game and receive audio feedback for their actions, the experience can be more engaging and immersive. As described by Collins (2009), "Interactive audio refers to the sound events directly triggered by the player... The player's input actions nearly always affect the soundscape of the game..." (p. 5) Interactive sound partly determines how a narrative is presented through an audio-visual medium (like video games) to maintain player's immersion and active engagement. Immersion may be broken in multimodal entertainment by the absence of sound, specifically when silence is not purposefully intended. For example, if a character collides with an object, the collision should make a sound as it would in the actual world. Additionally, ambient diegetic sounds make the game world more convincing to the player. In games like *Grand Theft Auto V* (2013), players experience diegetic city noises within the urban landscapes of the game. *Grand Theft Auto V* is set in Los Santos, a sprawling fictionalized version of Los Angeles, so players can hear the chatter of pedestrians, car horns, helicopters, police sirens, music



coming from shops, etc. By hearing specific sounds that they would expect to hear while playing, the player knows that they are engaging correctly and progressing through the narrative in the intended way. But if a sound cue is missing from a situation where the player expected one, the silence may break this immersion.

Even so, game sound composers may choose to break immersion on purpose to punctuate specific events or actions. An example of this practice can be observed in how the *Dark Souls* series uses music. While the musical score of the game is heard in various non-diegetic contexts, such as on the title screen or during cutscenes, almost no music is used while the player is in control of the avatar within the story world. As the player explores the world, defeats enemies, and collects items and equipment, the sound design of the game revolves entirely around diegetic sound with no backing score. However, the non-diegetic musical composition always plays when a player fights a boss and ends when the boss is defeated. These applications of sound and silence serve the dual purpose of increasing a player's immersion while exploring the world and highlighting boss battles as special and significant occasions. *Dark Souls* (Miyazaki, 2011) is an example of how sound can be used in very specific and deliberate ways to fulfill a rhetorical purpose. The game usually prioritizes player immersion over an engaging non-diegetic soundtrack. However, it still makes infrequent use of non-diegetic compositions to create contrast for the player that both signposts something important while renewing their attention and engagement in the moment. These designs make non-diegetic music in the game a much more significant aspect of the player's experience and trains them to think about the specific rhetorical contexts of the characters and situations attached to those compositions.

Conscious sound design is imperative for invoking player-driven rhetorical responses in games, especially when a game's narrative is mostly straightforward. An example of this is how composer Grant Kirkhope uses the dynamic musical score and sound design choices of *Banjo-Kazooie* (Rare, 1998), released for the Nintendo 64. *Banjo-Kazooie* is a three-dimensional action-adventure platform game that places players in control of Banjo, an anthropomorphic brown bear, and Kazooie, a bird of the fictional Red-Crested Breegull breed that lives in Banjo's backpack. Banjo's younger sister, Tooty, has been kidnapped by a local witch named Gruntilda who plans to steal her youth and beauty through a special machine. As Banjo and Kazooie, players must rescue Tooty from Gruntilda's lair. The game places rhetorical emphasis on character personalities, character relationships, and game environments using specific instrument choices and the blending of diegetic and non-diegetic aural elements to create player immersion. *Banjo-Kazooie* is important to analyze in a ludomusicological context because it shows how sound can influence a player's engagement with a game. The sound design of *Banjo-Kazooie* rewards attentive and engaged players by guiding them in rhetorical directions that they would not normally pick up on through visuals or verbal cues alone. Additionally, putting in the effort to engage with its soundtrack more attentively can allow players of *Banjo-Kazooie* to achieve a heightened sense of immersion in its world and characters.

The title of the game, *Banjo-Kazooie*, is sonically and rhetorically charged, as it signifies how integral music and sound are in defining the game's characters and their narrative world. The three leading protagonists of the game, Banjo, Kazooie, and Tooty, are named after and inspired by the qualities of different musical instruments. Banjo is

named after the iconic stringed instruments of traditional folk and country music. Fittingly, he is represented in the musical score of the game by a banjo and the banjo melodies used in these compositions. The banjo is often perceived as both an easygoing and meandering instrument and a joyful and energetic one depending on the composition and context. This is reflected in Banjo's personality through his vocal sound effects. In dialogue, Banjo usually speaks with a calm and easygoing sequence of grunts whereas he makes joyful and energetic exclamations such as "whee!" and "doh!" when performing actions such as jumping or rolling. Kazooie, in contrast, is named after a kazoo and is much brasher. This is reflected in her vocalized sound effects, abrasive squawks in dialogue and loud bird screeches and coos when she performs actions. Reflecting Kazooie's preference to hide in Banjo's backpack and only emerge when needed, kazoos are very rarely used in the game's backing score. Instead, they are used to highlight the various special abilities that Kazooie can learn over the course of the game. This can be heard in the jingles for many of the game's powerups, such as the "wonderwing" ability or the "speed shoes." Lastly, Tooty is named after a flute. The developers originally planned to call her "Piccolo" in the early stages of the game and opted to identify her with her original instrument after the name change.<sup>2</sup> The sound of flutes is often considered to be cheerful and sweet, much like the personality of the young and naïve Tooty. When she speaks, she sounds hyper and shrill. By giving distinct musical and sonic qualities to each of the characters, it is easier for the player to associate certain sounds or pieces of music with events and characters. The observations of Rodrigue et al. on the symbolic power of sound reflects that taking a ludomusicological approach to

---

<sup>2</sup> <https://i.redd.it/i7diamx7jh951.jpg>

game analysis reveals a host of new meaning-making opportunities that would not be otherwise possible. The instrument choices reinforce characterizations and character relationships audially, adding a layer of complexity for players. At the same time, the naming conventions of the characters and their counterparts in the musical score act as sonic symbols that support what players learn about the game's narrative world through its auditory elements.

Besides functioning as a tool to identify characters, the game's dynamic score also develops the main conflict of the narrative by conveying an aural relationship between the player and the game's antagonist, Gruntilda (Grunty), a villainous green witch. The fairy-tale quality of her appearance is reflected in her dialogue patterns, as she always speaks in couplet rhymes. Although the game does not possess any voice acting and the player will have to read these rhymes themselves, her unique speech patterns further characterize Gruntilda as the stereotypical, cackling, evil fairy-tale witch. Grunty is associated with brass instruments in the musical score, especially brass instruments with very low timbres such as tubas and French horns. While the other main characters are represented and characterized by the instruments they are named after, Grunty is unique in that her name bears a closer resemblance to a guttural, human utterance. This distances her from the other characters by labelling her as an undesirable sound.

However, when comparing that sound to how she is represented in the musical score, brass instruments are often used in low and "grunting" timbres, such as in the tracks for the Rusty Bucket Bay and Clanker's Cavern areas. Her lair is almost a character on its own, as it and the entrances to the areas it contains are often associated with melodic mallet percussion instruments such as xylophones, glockenspiels, and marimbas as well

as certain stringed instruments such as violins and harps. Whenever these instruments are used, they signify Grunty's connection to a place or character, or more explicitly highlight her presence. The overarching use of these musical elements in many of the game's songs highlight her oppressive presence and suggest to players that they are always in her crosshairs no matter where they are in the lair or its connecting locations. Gruntilda, despite being the antagonist, is granted very little screen-time over the course of the game as Banjo's entire journey revolves around ascending her lair to reach her, and Tooty's, location. By incorporating so many elements of her character into the sound design of the game, the engaged player forms a connection with her and identifies her traits just as easily as the characters they engage with for much of the game. This example illustrates how even small symbolic details in a game's sound design go a long way in creating player narrative immersion and supplementing the game's visual, verbal, and procedural rhetoric.

Just as the portrayals of the game's characters benefit from musical identification, the player is driven to connect with the locations they explore through musical motifs. An early example of music that supplements a location-based rhetorical purpose is Kirkhope's use of the emotional contrast between the protagonist's instrumentation and the antagonist's instrumentation in the starting location of *Banjo-Kazooie*, Spiral Mountain. Spiral Mountain, the home of the three main protagonists, is a spacious, country mountainside that is designed for players to explore and learn the mechanics of the game. The track in this area incorporates diegetic nature sounds, the chirping and cawing of birds, which suggest that Spiral Mountain is an appropriate habitat and haven for the main characters. At the same time, Grunty's tuba and xylophone can also be heard

driving the track along. It may initially seem strange that these Grunty associated instruments are present in the area; however, Spiral Mountain also contains the entrance to Gruntilda's lair, a giant stone head resembling the witch herself that juts out from one of the mountain's rocky walls. This suggests that, while Gruntilda does not directly inhabit the area, her influence and presence is still felt by the characters, looming overhead. This is even further highlighted as the characters approach her lair for the first time. As they cross the bridge into the witch's mouth, the banjo and flute melt away from the score and are replaced solely by an echoed, ominous xylophone solo with a few violin cords. This provides the overarching tone of the narrative and shows how important sound can be in providing locational context and atmosphere. Aside from the procedural application of this change being triggered by the player, it also sets a precedent in the score that highlights the rhetorical importance of specific instruments or motifs on their own merit. By offering unique dynamic changes in the soundtrack, the player must actively engage to achieve immersion, convincing themselves that progressing into a new area does have consequences for the narrative and gameplay. This shows how rhetorical and procedural elements can be provided sonically.

While the presence of specific musical themes can help a player generate a clear concept of the game's characters and world, the narrative can also use sonic rhetoric to disrupt these themes. Within the lair, the jarring absence of specific instruments or the extra layer of diegetic sounds further pushes a specific rhetorical purpose onto the lair. The lack of the prevalent banjo and flute from the previous area signifies the player's transition into an unfamiliar and antagonistic place. This is further emphasized by the track's use of Grunty's diegetic laughter. Her cackle can be heard echoing through the

halls at numerous points in the track. Grunty also periodically speaks directly to Banjo and Kazooie from an unspecified place in the lair, accosting them with mocking rhymes. It is in this way that Kirkhope gives the lair rhetorical significance through the score that represents it. The clashing of musical styles and instrument choices used in the score maintains the game's rhetorical argument that, while very little time is spent with all of the main characters in the same space, the characters are constantly at odds and interacting with each other. This vehicle for delivering the game's narrative and generating meaning for the player relies almost entirely on the audial elements of the game. In this way, a significant portion of the game's rhetoric is presented sonically and may only be received by players that engage thoughtfully with the game's audio.

*Banjo-Kazooie* contains many iconic and engaging elements that have kept fans discussing the title for so long after its release, and the care and attention given to the game's score and sound design by Kirkhope is one of the most significant of these elements. *Banjo-Kazooie* is a relatively old title, having been accessible to the public for 24 years as of 2020. However, the game and its soundtrack remain popular to this day, speaking to the overall quality of the game as an affective media object. Kirkhope's use of dynamic and interactive sound, the identification of characters with sonic elements, and the use of diegetic sound to heighten player immersion in the game world are all major contributing factors to the game's overall identity. The constructs of sound design in *Banjo-Kazooie* are now implemented on a much larger scale in contemporary releases because of how effective they can be in delivering the rhetorical intentions of the developers and allowing players to engage with game worlds to generate their own meaning. Without the sonic context of the game, players would miss a large part of what

makes the game's personality and narrative structure unique and classic to this day. Thus, my reading of *Banjo-Kazooie* demonstrates the importance of ludomusicology to rhetorical analysis by revealing how games create significant meanings for players audially.

### **Making Connections through Sonic Details and Player Performance**

Exploring the many ways that composers can use game sound to generate rhetorical meaning (Rodrigue et. al 2016) connects well with Collins' (2008) concepts of symbolic sound and player performativity. While composers can use music and sound in games to achieve a variety of rhetorical purposes, using specific musical motifs to highlight important aspects of the narrative or to elicit specific emotional responses are some of the most common and effective ways they do so. Studying these concepts through a ludomusicological lens highlights how the addition of player performativity and engagement makes the process rhetorically effective. When a player is largely responsible for their own meaning making through the affordances of the game, it allows the player to actively engage with sonic feedback in the forms of repeated leitmotifs, emotionally driven sonic storytelling, and symbolic sound that promote meaningful attachment to the game's characters or narrative.

The use of leitmotifs for storytelling in video game audio is an important way to deliver information through sound. Another example of a game that benefits from this kind of ludomusicological study is *Undertale* (2015), an independently created, written, and composed title by Toby Fox that makes heavy use of leitmotifs and character identification. As stated by Matthew Perez (2017), the game uses the leitmotif technique that is a staple of musical theater to help drive the narrative. Specific characters and



narrative themes have their own musical motifs and characteristics, and these short motifs can be heard at various points throughout the story in compositions that reference them. The player's battle against one of the NPCs, Asgore, demonstrates how the game's developer uses leitmotifs to support *Undertale*'s narrative. The track that plays during the battle, "ASGORE," contains a section that incorporates the melody of another track, "Heartache." Heartache is the leitmotif of another character, Toriel, who is emotionally connected both to the player's character and Asgore. Incorporating these two musical compositions together during the fight sequence makes narrative connections between characters clearer to the player and provides the player a means to generate their own emotional and meaningful connections to the characters through the auditory mode. In this way, the symbolic power of music and sound provides a much more impactful and immediately recognizable method of narrative storytelling within a game world. Whereas visual symbolism is already a major construct of rhetorically charged media, sonic symbolism can be used by composers to create engrossing and encompassing rhetorical messages that span a range of senses and delivery mediums.

Effective storytelling through game sound is also achieved when the player directly interacts with that sound. Collins' concept of player performativity assumes that players have a direct role in what they hear through performing actions in a game world. Regardless of genre, platform, or narrative context, video games offer audible feedback such as the sound of footsteps when a character moves or dynamically lowering the volume of a sound as the player moves away from its source. Because players have a direct effect on the audio played during games, sound in video games can be performative as well as diegetic. Considering a player's actions alongside game audio

highlights the vast potential for rhetorical storytelling through sound in games. Some games give the player a significant level of control in affecting the aural components of the game. While engaging with a game's sound design already provides opportunities for increased player engagement and immersion, allowing the player to directly change the sound of a game gives players some control over the game's meaning-making. Not only does this demand a large amount of engagement from players, it effectively allows them to experience sonic rhetoric in a way that is unique to them.

An example of this performative approach to sound in gameplay is the Nintendo DS title *Electroplankton* (2005). During the game, the player observes and interacts with microscopic creatures called Electroplankton in various environments, making music by controlling the sounds that occur as a result. In the aptly named "Performance" mode, the player can command the plankton, each one making a unique sound, to swim in specific patterns that control their pitch and the length of their notes or collide with other objects in the environment to produce new sounds. This is a form of rhetorical composition in which the player composes both music and the game world itself. The player is encouraged to experiment and is largely responsible for how the soundtrack for the game unfolds. Each unique environment changes the tools that players have at their disposal to compose their music. For example, the environment named "Hanenbow" features a small plant with three leaves on each of its sides sitting in a body of water. Small aquatic Electroplankton resembling tadpoles will periodically jump out of the water and the player can adjust the positioning of the tree's leaves to "catch" the plankton, making them bounce between the leaves to generate notes. *Electroplankton* demonstrates that it is possible to build engaging games with an interactive aural foundation that opens the

door for expanding research on specific auidial components of games. When viewing the player as a “performer,” game developers have a wealth of options in creating rhetorical contexts for the player to have an extended range of control. As the player “performs” actions in the game, they have direct and indirect roles in influencing how sound reacts to those actions. However, in the case of a game like *Electroplankton*, the concept of player performance can be taken to the extreme. Instead of the player performing via guidelines and limitations set by a composer, *Electroplankton* delivers the entirety of its rhetorical intent through making the player a composer. This allows the player to shape the auidial landscape of the game to their will. Without the auidial feedback of the different musical sounds the player can make, this scope of control would be much less impactful.

A more subtle use of player performativity for a thematic and immersive rhetorical purpose is presented in the Nintendo GameCube title *Chibi-Robo!* (Nishi & Moriyama, 2005). *Chibi-Robo!* places the player in control of the titular character, a tiny robot manufactured as an automated cleaning, housekeeping, and general quality of life improvement unit purchased by the suburban Sanderson family. Because of the role given to the player through the narrative setup, the gameplay loop initially emphasizes performing chores. As *Chibi-Robo*, players are responsible for exploring the Sanderson home day and night, cleaning up after whatever messes the family leaves behind. This includes mopping up spills, washing stains off the walls and floors, picking up trash and food debris, etc. Hirofumi Toniguchi, however, subverts the player’s expectations for these goals through the dynamic sound design he implements in the game. By doing so, Toniguchi also directly subverts the player’s expectations of the rhetorical significance of *Chibi-Robo*. Whereas a player might assume that the game pushes a mundane and tedious

rhetorical environment on them, the sound design of the game suggests that the opposite is true and transforms the initial assumptions of the player with an unexpected level of personality and dynamism. This is largely accomplished through contextual sound effects and pleasant melodies that are attached to various actions in the game.

Toniguchi accentuates the player's performative role and its significant impact on the diegetic sound on the game by using sound to give chores a whimsical and energetic quality. Because Chibi's sole reason for existing is to make its owners happy, the game immerses the player in that role by giving Chibi a perceptible personality in every action that it does through sounds. Every action that the player can perform as Chibi is represented by a unique instrument, sound effect, or melody. The simple act of walking from place to place is made more energetic as Chibi's feet make the sound of plucking strings, and this sound changes depending on where the player is within the household. Walking on a carpet as opposed to the wooden floor softens and muffles the sound of these footsteps while walking on the tiles in the kitchen makes the notes light and hollow, like a xylophone. This sense of personality is further accentuated in more complex actions whilst performing chores around the house. For example, players can repurpose scavenged household objects as useful tools, such as using an old toothbrush as a makeshift mop. Each time the player uses it to scrub the floor, a piece of an acoustic guitar melody plays. Because the song is played in increments, the player will only hear the full melody if they continuously scrub the floor for a few seconds. This both incentivizes them to clean more thoroughly (as Chibi would) and makes the act of cleaning engaging. Toniguchi's approach to sound design in *Chibi-Robo!* illustrates how miniscule aural details can impact the rhetorical significance of a player's mundane and

complex actions within a game world. The seemingly tedious and boring act of scrubbing the floor with a toothbrush takes on a more meaningful and interesting quality when paired with the context of the game's narrative and the sound effects that help present it. In this specific case, audio is the key factor in making this rhetorical intention clear to the player. If looking at the action of the game solely through the visual modality, a player may not be convinced that *Chibi-Robo!* is anything more than a household chore simulator. This is exemplary of why sonic rhetoric is a helpful, albeit widely underutilized, tool in game design and why ludomusicology can expand discourse on sonic rhetoric in media.

Character-driven adventure games also often make use of sonic rhetoric and the player's interaction with sound in the game world to influence their narratives. The use of sound in these ways can take many forms, such as using music and sound to generate a specific emotional tone or make the environment more convincing. Sound design techniques, such as using specific instruments to invoke particular emotions, using the tone of the music to foreshadow or help the audience recall previously important information, or using recurring sonic themes throughout the game to help the audience form relationships with characters, are all methods that game composers employ. Because of the depth and complexity that these tools offer for developing game narratives and rhetoric, there is an abundance of opportunities to examine more examples of sound in game studies research. A title that demonstrates rhetorically focused sound design in this way is Infinite Fall's *Night in the Woods (NitW)*, which makes use of specific musical leitmotifs, player performance, unconventional instrument choices, character and

player identification, and diegetic game elements to make meaning through its sound design and musical score.

*NitW* is a two-dimensional single-player adventure game co-designed and written by Scott Benson and Alec Holowka, with Holowka also providing the game's original score and Em Halberstadt working on general sound design. The game was originally released in February 2017 on Microsoft Windows, Mac OS, Linux, and PlayStation 4. Since its release, *NitW* has garnered widespread critical acclaim with most of its praise directed at the quality of the character development and narrative writing. However, the development team has not gone without its share of controversy, specifically surrounding sexual abuse allegations directed at Alec Holowka in 2019, which eventually led to his subsequent death, detailed in a recent BBC News article (2019). Holowka's passing has caused uneasiness for Benson, other development team members, and the game's fans. However, the score of the game, and the way it works with the design principles employed by Halberstadt, remains relevant and significant for its rhetorical contributions to the player's overall narrative experience within *NitW*.

*NitW* is a complex narrative that immerses players through a combination of specific visual and audial choices. The game's colorful world is populated by anthropomorphic animals and is set in the fictional town of Possum Springs, a historic industrial mining town that is on the verge of an economic collapse. The game's narrative follows the protagonist Mae Borowski, an anthropomorphic cat and young adult who has dropped out of college and struggles with an unspecified mental illness (implied to be an anxiety disorder). She returns to her hometown of Possum Springs with little notice to her family and friends and attempts to continue living her life as normally as possible.

However, Mae's actions and attitudes cause problems within her family and friend group. Concurrently, strange disappearances of certain townsfolk begin occurring that are said to be the work of a cult lurking in the woods. The result of combining these narrative components is a game that is, effectively, a horror game. However, the cult subplot is a deliberate distraction from the game's main horror: existential dread. While the game's colorful and poppy visual style betrays this underlying tone, Holowka makes consistent use of its score and sound design to further emphasize the appropriate emotions and character motivations that support that tone.

While *NitW* makes use of many visual and compositional techniques to convey its story, the score of the game is one of the most significant and important pieces of the game for the player's holistic narrative and thematic experience. One of the ways Benson and Holowka tackle the heavy themes of the narrative is through Mae, the anti-heroine player-character. Throughout the game, Mae is portrayed as being selfish, rude, socially oblivious, manipulative, needy, reckless, and sometimes even cruel, but she also manages to be self-conscious and critical. She is riddled with anxiety and fear about the unknown, is uncomfortable being left alone, and requires constant reassurance and validation. Forcing the player to identify with this kind of character serves as the vehicle through which Benson and Holowka can deliver the game's narrative themes.

For example, the game makes use of silence as an impactful and deliberate rhetorical design choice. *NitW* possesses no audible voice acting and delivers character dialogue exclusively through written text. This may have been a conscious design decision to cut back on the production time and cost of the game, but the lack of human voices throughout the game provides a unique opportunity to remove aural distractions

from the game's sound effects and score. While music is present in the background of much of the game's scenes, deliberately choosing to take that sonic constant away sets the tone for many rhetorically significant scenes. Examples of significant silences include Mae's painfully awkward ride home in the police car of her aunt whom she despises and an emotional moment where Mae learns what she has done wrong to cause her former best friend's cold behavior towards her. The absence of sound in these scenes emphasizes the situation and highlights the character's conversations in text. Regardless of the initial context of the decision to eschew specific auidial components, silence is still a deliberate auidial choice utilized by the developers to create rhetorical significance in the game. Choosing to deliver a large part of the game's rhetorical themes in this context encourages the player to form a relationship with the game's auidial elements and makes the experience incomplete without them.

Another way the game reinforces its narrative through sound is through Mae's emotional and mental states. Specific tones and moods generated by the game's score pair with Mae's emotional responses. For instance, the narrative opens with Mae arriving at the Possum Springs bus station late at night after travelling home from university only to realize that her parents have forgotten to come pick her up. Because of the bus stop's secluded location, she is forced to walk through the woods and climb over the fence of the old abandoned playground. Throughout this journey home, the player is not exposed to much of the game's score, but rather a subtle mixture of diegetic sound effects and the subtle hints of instruments periodically. This creates a dissonant, almost ominous atmosphere and sets the players expectations of the narrative's tone through explicitly sonic means. From a rhetorical perspective, the soundtrack both informs the player of



situational context, while also allowing them to form the beginnings of an emotional connection to the game through experiencing similar emotions to Mae.

Just as a game like *Undertale* would not have an as affective or celebrated soundtrack without its use of specific themes and leitmotifs, *NitW* makes equally heavy use of these audio threads to weave a complete narrative through the meaningful use of repetition. As the score reflects Mae's emotional attachment to various people, locations, and situations, it would make sense that the audio that accompanies her home is significant to her identity. Regardless of what is happening in Mae's life during the game's narrative, the tracks used in her home remain consistent. The track "Come Home" which plays when Mae returns home for the first time on the night she arrives, is only eight seconds long. However, those eight seconds provide an immediate tonal shift for Mae and, by extension, the player. The simple six-note piano melody, which is a melody that is often used in various other tracks throughout the game accompanied by the violin and the plucking of the acoustic guitar, conveys to the player that they are finally safe by transitioning from complete silence to the welcoming tone of the track. The combined feeling of safety and belonging from the repeated motifs of the track causes the player to associate Mae's house with reprieve. One may argue that the music associated with Mae's house is simple because of technological limitations, or that it actually is not as significant to the story as one would imagine; however, the existence of compositionally complex and tonally rich tracks in the rest of the soundtrack such as "Back to the Holler" and "Pierogies in the Dark" suggest that the audial choices made here are deliberate. From a ludomusicological standpoint, this shows that sonically driven emotional symbolism is an effective and efficient way to convey things to a player in a natural,

engaging, and more relatable manner than simply using text or some other exclusively visual medium. Using these auidial symbols repeatedly throughout the narrative signposts significant rhetorical themes to players while constantly reaffirming their connection to events and characters in the game.

As the score changes to reflect the tonal state of the current narrative context of the game, we can also look to the use of discord and dissonance in the score to analyze a deeply important plot point in *NitW*: Mae's mental health. Mae's anxiety disorder is an important recurring theme in the narrative, brought up explicitly through dialogue as well as through various visual and auidial signifiers. In the narrative, Mae's anxiety surfaces as the town and her friends show signs of changing. An example of how the soundtrack emphasizes Mae's feelings toward her situation at home is the track "Back to the Holler," which plays while the player explores Possum Springs in the first chapter of the game. Mae's internal conflict is represented in the song through the tonal contrast between the piano and strings of the guitar. The tone of the track is interrupted intermittently by discordant piano chords, which detract from the melody of the song and sound vaguely out of place. This is further emphasized by a constantly pulsating and gargling breathing sound beneath the track, which sounds like a respirator. In the context of Mae's connection to Possum Springs, it may represent her witnessing the town dying and taking its last breaths before her very eyes. These auditory elements remind players that Mae cannot escape the underlying reality of her situation, and her own emotions are causing discord in her emotional state. The presence of seemingly out of place and discordant auidial elements in a song that is tonally completely different creates tonal contrast for the player and indirectly makes them feel closer to what Mae is feeling. While some of this

information is conveyed to the player through visual cues and verbal exposition, the music serves as another mode for communicating these meanings and complexity. While the music is not necessary for a player to understand what is happening, it contributes a great deal to making the player *feel* what is happening, especially when specific elements of the score sound unusual to deliberately provide rhetorical context. When considering sound as more than just an audible process, the rhetorical value of using sound for emotional guidance cannot be understated.

*NitW* also makes rhetorical points through interactive sound, especially during in-game player-character musical performances. A sequence early in the game has Mae attend band practice with her friends during which the player is tasked with performing the bass guitar part of the song through a mini-game inspired by the rhythm game genre defining the *Guitar Hero* (2005 – 2015) franchise. The main facet of the game's interface that the player interacts with is a continuously scrolling vertical track (called a "highway" in-game) that resembles the neck of a guitar. The highway is divided by horizontal bars representing guitar frets which keep the pacing of the song and five vertical lines that represent guitar strings. Color-coded note icons scroll along the highway from the top to the bottom, and players are tasked with holding down the correct fret button and strumming the bar on their guitar controller when the note reaches the bottom of the highway to successfully play the song. A simplified version of this concept forms the band minigame in *NitW*, in which players need to press the corresponding buttons on their controller or keyboard to play the notes. Much like in *Electroplankton*, the player is presented with the unique opportunity to directly control a musical performance within

the game. But unlike the complete compositional freedom of *Electroplankton*, the *NitW* rhythm minigame serves as a much more important narrative and rhetorical feature.

The song performed by Mae's band, titled "Die Anywhere Else," serves an important rhetorical purpose in the game by revealing the motivations of the game's non-player characters to leave Possum Springs and do something more with their lives. The song was written by one of Mae's high school friends, Casey. Casey has recently gone missing, an event that is perceived by his friends to have been a conscious attempt at running away from home. As such, the lyrics of the song reflect how Casey feels trapped in Possum Springs and will take any opportunity to leave so that he can "die anywhere else":

Dust on this tired old street

Mark corners where we used to play

Dust traces our tired old feet

In circles as we pace our time away

I just want to die anywhere else

If only I could die anywhere else

So come with me, let's die anywhere else

Anywhere

Just not here

(Holowka, 2017, track 13)

This song serves as an important piece of foreshadowing and, eventually, irony; however, the game further obscures the initial importance of the song through procedural and performative means. Because the game has no voice acting, the main melody of the song sounds out how the lyrics should be sung while the player performs it. The words are exclusively displayed at the bottom of the screen in subtitle format. While the band practice minigame is a recurring event over the course of the narrative, the band only practices “Die Anywhere Else” once. The only way to replay the song without starting a new game is to practice it alone by using the bass guitar in Mae’s room. A player may miss what the lyrics of the song convey the first time they perform this sequence because of their focus on playing the notes correctly. However, this is also a deliberate way to purposefully obscure the song’s initial importance to the plot. The player is tasked with paying close attention to the screen and following the scrolling notes while simultaneously listening to the melody of the song to make sure they stay on beat. In this context, the player is temporarily asked to put the narrative aside to instead focus on playing the song correctly, just as Mae is attempting to do after not practicing for such a long time. The amount of effort that the player must put in increases their immersion and places them in almost the exact same position as Mae. This is an example of immersion that both supports and subverts the idea of player engagement as a means of delivering a narrative. When applied to sonic rhetoric and game scholarship, this shows how giving an audience a performative role can serve a dual purpose. Not only does it engage them and keep their attention. It can also be used to purposefully structure a rhetorical intent

around saving the reveal of a point until a time where its significance will be most effectively understood by the audience.

The narrative of *NitW* is a mostly linear experience but the player does have the choice to make Mae participate in the game's procedures in different ways, and these options often relate directly to sound. One example of this is the extended opportunity for the player to practice any of Mae's band's songs by having her interact with her bass guitar in her room. In the context of the game's narrative, this represents Mae attempting to actively improve at something constructive as is reflected in her notebook. Mae draws small sketches referencing characters and events from the game in her notebook as the player completes significant actions over the course of the game. Sketches of Mae playing the bass are rewarded to the player for completing the band minigames, with the player's quality of performance being reflected in the sketch. If the player wishes to improve upon their original performance, they can do so by practicing in Mae's room which will prompt her to replace the sketch. This is a further indicator as to how important music is to identifying Mae's emotions and mental state. The better the player performs the song; the better Mae feels about herself which is reflected in her self-portraits. This process incentivizes further player engagement with the game through the accomplishment of Mae's success. Using a ludomusicological lens to analyze how video games incentivize players to engage with them in sonic contexts can reveal a lot about why game narratives can be so rhetorically effective.

Taking all of the sonic elements of *NitW* into account, including the ideas of rhetorical intent, narrative progression, and player performativity, it is clear that the creative use of elements both on their own and paired with other elements of a game's

design can create unique rhetorical experiences for players. In many ways, *NitW* features similar sound design philosophies to those found in other games, such as *Banjo-Kazooie*. However, while both games use similar concepts such as instrumental personification, sonic symbolism, and player performativity/procedurality, *NitW* uses them in unique ways to provide a completely different narrative experience. While Kirkhope's score for *Banjo-Kazooie* focuses on guiding a player through character relationships, Holowka's score for *NitW* aims for a much more personal connection between the player and the game's protagonist through the manipulation of sound in unexpected ways. Dissonance and the use of sparse soundscapes for specific situations in *NitW* creates unique moments that subvert a player's expectations and create memorable connections to situations that they experience with Mae. Furthermore, the procedural and performative roles of the player are affected by sonic rhetoric in both games, but in unique ways. While *Banjo-Kazooie* uses its dynamic score to guide a player through the environments and narrative by playing a key role, *NitW* gives players much more direct control over Mae and her sonic situations, such as becoming a musical performer in Mae's band.

Analyzing the use of sonic concepts in the designs of all the games touched on in the thesis highlights that sonic rhetoric is a powerful tool that can be adapted to fit almost any rhetorical purpose across all mediums. The interactive and engaging aspects of games make it easier for an audience to connect with the game's rhetorical purpose and keeping this in mind can aid in making rhetorical intent more impactful by considering the engaging elements of the project. *NitW* is an example of an experience that uses the deliberate subversion of a player's expectations to affect their emotions and thoughts throughout the course of the narrative. Pointing out the dissonance created by out of place

audial elements is effective because it demands active engagement from an audience and creates a more memorable experience for them. While the sonic concepts used in *NitW* are similar to those used in other games, they are able to create completely different rhetorical contexts through a combination of both active author and audience engagement, showing how versatile and effective sonic rhetoric is.



## Conclusion

Video games are a rapidly developing medium, pushing the limits of hardware, software, and developer creativity through sound. It is important that we discuss how game studies research might approach sonic rhetoric in the ways it examines visual, verbal, and procedural elements in games. Effective narratives in games have been studied for decades, often with an emphasis on the quality of writing, the use of visuals for metaphors and symbolic rhetorical themes, and the gameplay affordances that allow players to immerse themselves in the life of almost any character they can imagine. However, as a specific topic of discussion, effective and rhetorical sound design in game studies continues to be relatively overlooked. It is imperative that we include effective sound design in our research because of the unique affordances it offers developers and players including leitmotifs, music, sound effects, performativity, silence, discord, and procedural sound.

By using a ludomusicological lens to examine sonic concepts, I have examined the aural rhetorical enrichments provided by the sound design of games across genres and generations. Games such as *Banjo-Kazooie*, *Night in the Woods*, *Undertale*, *Electroplankton*, *Chibi-Robo!*, and more illustrate the need for more studies of game sound, as ludomusicology has much to offer designers, players, and scholars. Dynamic scores and soundtracks can play a key role in a player's perception of a game world, its characters, its environmental context, and their role within the narrative. Moreover, the absence of sound or the jarring discord between sound design choices in games can enhance the overall effect of specific rhetorical choices. Likewise, there are also many and varied applications of player performances of sound in games that give the player

agency, which can further increase player immersion and rhetorical effectiveness. While all of this is accomplished through game sounds, when paired with other elements such as the visual or verbal, these auditory components have the potential to nuance the way we approach studying and designing narratives in games.

By carefully considering sound design, developers can offer players experiences that are wholly unique. By using sound and music to great effect when trying to convey emotion and rhetorical purposes. In this sense, sound is wholly beneficial both to the experiences that players want to have with games and the positive feedback that this generates for developers who carefully implement sound in their projects.

One way to supplement the already affective nature of music and sound is to give a player a more direct role in influencing it. One of the major deviations from Bogost's (2010) procedural rhetoric that can be made through sound is player performativity. By giving the player active agency over what happens in the score of a game, designers can allow players to engage more with the game and give allow them to generate their own unique emotional experiences. As seen in *NitW*, affording players the opportunity to experiment and achieve relationships with sound through their own actions can create a rich and layered narrative experience. Allowing players creative control and flexibility over games' auditory elements is also valuable as it shows the extent of control sonic rhetoric has over players' meaning-making experiences. Karen Collins' (2009) observations on player performativity and the unique ways in which players can engage with sound shows us that sonic rhetoric in games should not be overlooked. In many cases, more involved study of a game's sound may reveal rhetorical potentials that were not previously tapped when analyzing solely the visual or procedural aspects of the game.

This point may be worth considering for developers who wish to implement similar compositional elements in their games, as it may make player immersion and engagement easier to achieve.

Furthermore, this study supports Gunn et al.'s (2013) observations on the standing of sound in general media and how it contrasts with the actual rhetorical potential of sonic contexts supports, demonstrating why the study of ludomusicology is pertinent and important. Sonic rhetoric's position in game and rhetoric/composition studies betrays its otherwise important implications for unique and engaging rhetorical meaning-making experiences for players. Just as players must engage with game sound to understand its immersive qualities, scholars of rhetoric and composition in both game research and other forms of media studies must engage with game sound to understand how effective it can be in transforming and delivering rhetoric, both by creators and players. By utilizing concepts such as player performativity, interactive sound, dynamic sound, and the perception of sound as more than just a basic auditory experience, game scholars can study the rhetorical potentials of sound in games through a ludomusicological lens. While sound is by no means completely disregarded in game development or research, it is often overlooked in favor of longer standing considerations in the field. Ideas about game rhetorics need to account for sonic rhetoric alongside prevailing forms, such as Bogost's procedural rhetoric. While scholars have already come to understand and appreciate game narratives through extensive research focused on visual and procedural elements, framing that research in novel ways that attend to alternative modes of expression can reveal nuanced ways to understand game narratives and rhetoric as well as how players engage in play, performance, and composition.

## References

- Benzies, L., & Sarwar, I. (Directors). (2013). *Grand Theft Auto V* [Computer software]. Rockstar North.
- Bogost, I. (2010). *Persuasive games: The expressive power of videogames*. The MIT Press.
- Brown, E., & Cairns, p. C. (2004). A grounded investigation of game immersion. *Extended Abstracts on Human Factors in Computing Systems*, 24-29. Retrieved from <https://dl.acm.org/doi/pdf/10.1145/985921.986048>.
- Ceraso, S. (2014). (Re)Educating the senses: Multimodal listening, bodily learning, and the composition of sonic experiences. *College English*, 77(2), 102-123.
- Chang, K., Kim, G., & Kim, T. (2007, September). *Video game console audio: Evolution and future trends* [Paper presentation]. Bangkok, Thailand.
- Chen, M. (2017, July 5). *Why story matters in video games*. The Mary Sue - The Nexus of Pop Culture and the Uncharted Universe. Retrieved from <https://www.themarysue.com/video-game-stories-matter/>
- Collins, K. (2008). *Game sound an introduction to the history, and practice of video game music and sound design*. Cambridge: MIT Press.
- Collins, K. (2009). *An introduction to procedural music in video games*. *Contemporary Music Review*, 28(1), 5-15.

- De Arteaga, P. (2018, August 14). *MIDI format in video games*. Video Game Music by Patrick de Arteaga. Retrieved from <https://patrickdearteaga.com/midi-format-in-video-games/>.
- Fox, T. (Director). (2015). *Undertale* [Computer software]. Toby Fox.
- Gunn, J., Goodale, G., Hall, M. M., & Eberly, R. A. (2013). Auscultating again: Rhetoric and sound studies. *Rhetoric Society Quarterly*, 43(5), 475-489.  
<https://doi.org/10.1080/02773945.2013.851581>.
- Hart, Iain (2014). *Meaningful Play: Performativity, Interactivity and Semiotics in Video Game Music*, Musicology Australia, 36:2, 273-290, Retrieved from <http://www.tandfonline.com/doi/10.1080/08145857.2014.958272>.
- Holowka, A. (2017). Die Anywhere Else. *On Night in the Woods Original Soundtrack Vol. 1: At The End Of Everything* [Record] Winnipeg, Manitoba
- Hudson, C. (Director). (2007). *Mass Effect* [Computer software] BioWare
- Infinite Fall. (2017) *Night in the Woods* [PlayStation 4]. Grand Rapids, MI: Finji
- Iwai, T. (Director). (2005). *Electroplankton* [Computer software]. Indieszero.
- Koizumi, Y., & Hayashida, K. (Producers), & Motokura, K. (Director). (2017). *Super Mario Odyssey* [Computer software]. Nintendo EPD.
- Kojima, H. (Director). (2004). *Metal Gear Solid 3: Snake Eater* [Computer software] Konami Computer Entertainment Japan
- MGP Live. (2020). *Legend of zelda: Symphony of the goddesses*.  
<https://mgplive.com/zeldatour>.

- Miyamoto, S., & Shimizu, T. (Producers), & Koizumi, Y. (Director). (2007). *Super Mario Galaxy* [Computer software]. Nintendo EAD Tokyo.
- Miyazaki, H. (Director). (2011). *Dark Souls* [Computer software]. FromSoftware.
- Night in the Woods video game creator Alec Holowka dies. (2019, September 2). Retrieved from <https://www.bbc.com/news/newsbeat-49555707>.
- Nishi, K., & Moriyama, H. (Directors). (2005). *Chibi-Robo!* [Computer software]. Skip Ltd.
- Peerdeman, P. (2010, April). *Sound and music in games*. Retrieved from [https://peterpeerdeman.nl/vu/ls/peerdeman\\_sound\\_and\\_music\\_in\\_games.pdf](https://peterpeerdeman.nl/vu/ls/peerdeman_sound_and_music_in_games.pdf)
- Perez, M. (2017) *Undertale: A Case Study in Ludomusicology*, City University of New York.
- Rare. (1998) *Banjo-Kazooie* [Nintendo 64]. Twycross, Eng: Nintendo.
- Robson, Dominic. (2002). Play!: Sound toys for non-musicians. *Computer Music Journal*, 26(3), 50–61.
- Rodrigue, T. K., Artz, K., Bennett, J., Carver, M., Grandmont, M., Harris, D., Hashem, D., Mooney, A., Rand, M., & Zimmerman, A. (2016). Navigating the soundscape, composing with audio. *Kairos: A Journal of Rhetoric, Technology, and Pedagogy* 21(1). Retrieved from <http://kairos.technorhetoric.net/21.1/praxis/rodrigue/index.html>.

Stedman, Kyle D. (2011). How music speaks: In the background, in the remix, in the city.

*Currents in Electronic Literacy*, 14. Retrieved from

<http://www.currents.dwrl.utexas.edu/2011/howmusicspeaks>.

Van Leeuwen, Theo. (1999). *Speech, music, sound*. New York, NY: St. Martin's Press,

Inc.

Warman, D. (2018, May 14). The evolution of storytelling in video games. Only Single

Player. Retrieved from [https://www.onlysp.com/the-evolution-of-storytelling-in-](https://www.onlysp.com/the-evolution-of-storytelling-in-video-games/?fbclid=IwAR1ISijkMUggm2zCbFf9uQ7yT_7D3-naUnCXALyrXsypeZqwDmEuTo_SNOE)

[video-games/?fbclid=IwAR1ISijkMUggm2zCbFf9uQ7yT\\_7D3-](https://www.onlysp.com/the-evolution-of-storytelling-in-video-games/?fbclid=IwAR1ISijkMUggm2zCbFf9uQ7yT_7D3-naUnCXALyrXsypeZqwDmEuTo_SNOE)

[naUnCXALyrXsypeZqwDmEuTo\\_SNOE](https://www.onlysp.com/the-evolution-of-storytelling-in-video-games/?fbclid=IwAR1ISijkMUggm2zCbFf9uQ7yT_7D3-naUnCXALyrXsypeZqwDmEuTo_SNOE).