Integration of Video Game Play and Storytelling in Theme Park Environmental Design

Alexandria Marcello
University of Central Florida
INTEGRATION OF VIDEO GAME
PLAY AND STORYTELLING IN
THEME PARK ENVIRONMENTAL DESIGN

by

ALEXANDRIA L.H. MARCELLO
B.A. University of Central Florida, 2014

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ABSTRACT

This thesis presents a visual design exploration of video game storytelling in physical themed environments, specifically, theme parks. The theme park industry has only recently begun to tap into the video game market, with seasonal attractions and events in parks, and the first fully video game dedicated land, Super Nintendo World at Universal Studios Japan. As theme park companies further seek out the most popular and profitable video game Intellectual Properties (IP), it will be imperative to create the most authentic video game experiences possible. The guest experience will hinge upon the successful adaptation of gameplay; creating the story around each individual as if they are the main character or party. This is a key concept that has yet to be achieved in any video game theme park attraction. The research and development in this thesis present design solutions to combat the limitations of existing video game experiences in theme parks. The new theme park model proposed provides an immersive guest experience that puts each guest or group at the center of a game’s story and propels them through space via innovations in operations and interactives, creating a unique experience for all. This general model can then be overlayed with any video game IP, to be utilized in any park, by any company, to varying degrees of scale and complexity.

Keywords: Theme Parks, Video Games, Storytelling, Gameplay
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# TABLE OF CONTENTS

LIST OF FIGURES .............................................................................................................................. vii

CHAPTER ONE: INTEGRATION OF VIDEO GAME PLAY AND STORYTELLING IN THEME PARK ENVIRONMENT ......................................................................................................................... 1

  Successes and Shortfalls of Existing Video Game Themed Attractions ................. 4

CHAPTER TWO: PROPOSAL FOR AUTHENTIC GAME PLAY AND STORYTELLING IN A THEMED LAND ................................................................................................................................. 7

  The Open World .............................................................................................................................. 8

  Guest Flow and Experience ......................................................................................................... 11

  Interactives Overview .................................................................................................................. 14

    Wristbands ................................................................................................................................. 14

    Mobile Applications ................................................................................................................... 17

    Checkpoint Kiosks ..................................................................................................................... 19

    Activating Retail, Food & Beverage ......................................................................................... 21

    Non-Playable Characters .......................................................................................................... 22

    Activating Static Props and Scenery ......................................................................................... 24

    Queues & Attractions ................................................................................................................ 26

    E-Ticket Overview .................................................................................................................... 28

    Story Overview ......................................................................................................................... 29
LIST OF FIGURES

Figure 1: *Land Site Plan*. Alexandria Marcello, 2022....................................................... 9

Figure 2: *Kiosk Overlays*. Alexandria Marcello, 2022................................................... 20

Figure 3: *Dark Ride Floor Plans*. Alexandria Marcello, 2022........................................ 28

Figure 4: *Boss Fight White Model*. Alexandria Marcello, 2022..................................... 37

Figure 5: *Boss Fight IP Overlay*. Alexandria Marcello, 2022. ........................................ 38
CHAPTER ONE: INTEGRATION OF VIDEO GAME PLAY AND STORYTELLING IN THEME PARK ENVIRONMENTAL DESIGN

The intersection of video games and theme parks, while relatively new in practice, is not a novel concept. As the two industries have flourished side by side over several decades, in hindsight, it seems almost too obvious that they were poised to inevitably merge. The introduction of early video games such as the Magnavox Odyssey and Pong in early 1970s, widely accepted as the advent of modern video games, trailed the emergence of Disneyland in 1955 by less than 20 years (Lowood, 2009). The idea of integrating the two industries has undoubtedly been in the minds of theme park and video game enthusiasts alike for decades. In addition to first-hand personal experience, attractions and partnerships such as the Pac-Man play area at Six Flags reaching as far back as 1983 give weight to this conjecture (Amusement Business, 1983).

Despite a history of the industries intertwining that has spanned three decades, encompassing heavy-weight gaming and park franchises such as Final Fantasy (Universal Studios Japan), Sonic the Hedgehog (Alton Towers), Mass Effect (California’s Great America), the video game themed environment and experience is only just beginning to bloom. This symbiotic relationship of theme parks and video games has only recently evolved beyond single events and attractions into massive scale, park-wide and land-wide gaming experiences such as the Datapad application at Star Wars: Galaxy’s Edge, and the first fully video game dedicated theme park land Super Nintendo World, at Universal Studios Japan, which opened in 2020 (“Super Nintendo World” 2021).
Academic research over the last two decades also points to the potential for future integration of video game play in theme parks, such as a study of cyber-physical play in theme parks by Raffe et al. (2015) which proposes that,

Cyber-physical structured play can be introduced into theme parks to create physical game-like experiences, where participants play in a physical environment or otherwise interact with a novel interface while the game rules and state of play are maintained by a computer system…similar to the agency-structure balance of a video game (p. 509).

Further academic correlation can be found in a survey of past and present mixed reality experiences in theme parks by Eddy et al. (2020) which proposes that the future of game play in theme parks can, and likely will be greatly enhanced by utilizing and improving upon mixed reality technology such as that used in Galaxy’s Edge and Super Nintendo World. Additionally, review of popular opinion shows, as Rob Fahey (2021), contributing editor to gameindustry.biz, states “the opening of the Super Nintendo World marks the first time that the [video game] industry has engaged with the theme park business (and vice versa) on a large scale…[but] Super Nintendo World is actually quite a conservative first move…” This statement succinctly summarizes the current state of the industry, noting the significant impact of Super Nintendo World opening, while also implying that the adaptation of the intellectual property and guest experience can, and should be expanded upon. The consideration of academic study and popular review of video game play and technology in theme parks prompts further examination of how a
more thoroughly authentic video game play experience can be achieved in theme park environments, resulting in enhanced guest engagement.

Super Nintendo World being the most comprehensive existing example of video game integration in theme parks as a full land can then be used as a baseline upon which to improve. The land follows typical theme park constructs, consisting of three attractions: Mario Kart dark ride, Yoshi’s Adventure family dark ride, and the Bowser Jr. virtual reality challenge, in addition to revolutionary interactive game play throughout the land, retail, food and beverage. The overlay of a video game intellectual property onto a fully-fledged theme park land, coupled with innovations in interactivity is what makes the project as a whole, revolutionary and no doubt will set a benchmark for future video game themed lands. Additionally, given the cultural and nostalgic stock of Nintendo, it has the potential to be as significant an anchor to the parks as Harry Potter (“Super Nintendo World,” 2021). Where Super Nintendo World, and subsequently theme parks in general, are lacking in the video game themed environment experience, is the implementation of video game storytelling and game play mechanics that engage guests as active participants in unique stories. A critical aspect of common video game play is that the experience hinges on the player taking the role of the main character, which Leibowitz (2012) highlights:

Regardless of how much control the player has over the story, during the game he or she does, to a certain extent, become the main character, sharing the hero’s triumphs and failures. With the player taking an active role in the process,
the thrill of defeating a powerful foe or the agony of a being unable to save a dear friend becomes all the more real (p. 43).

Therefore, when evaluating the guest experience as it relates to video game play in a physical environment, one must ask, is a video game theme park fully immersive if the guest is not centered in the experience as the main character or “player 1?” Is a guest simply existing as themself, in this case, within the world of Mario, or are they transformed into the main character as they play through the land? Is the story and experience impacted by their actions and choices, or are they moving through the same experience as every other guest, as only a passive participant? These questions are the basis for the research and design solutions presented in this thesis, which expands upon current, existing video game themed environments to form a theme park model that more fully utilizes video game storytelling and play mechanics to create a truly immersive and authentic video game experience in a physical space.

Successes and Shortfalls of Existing Video Game Themed Attractions

In order to determine a solution for better integration of video game play and storytelling into future theme park design, the shortfalls of existing video game-based theme park attractions must be explored, and then remedied. As Raffe et al. (2015) surmise, there is a gap in current theme park experiences that cyber-physical play may be able to fill, in order to provide more unique and adaptable experiences for guests. In this instance, Super Mario World, will be used as a case study to highlight what is successful and what is lacking. Additionally, the definition of the word immersive must
be considered as a benchmark for what is attempting to be achieved by the design of a themed land, as a common and core goal of all theme parks is to create a fully immersive themed environment for guests. Through the lens of theme park design, what does “immersive” entail for a player in a physically realized video game? Scholarly research by industry experts such as Dr. Scott A. Lukas (2012) sheds light on the appropriate definition and application of the word immersive as it relates to themed environments summarizing it as a state in which a person is taken into and made an active part of another world, story, or place by engaging as many senses as possible while suspending disbelief, resulting in full absorption of the person in the story and space.

The effectiveness of Super Mario World as an immersive environment can then be filtered through this definition of immersive as it pertains to the guest or player experience in a themed environment, and in a video game. The guest is certainly transported into another world, with a story to be told, that of Mario versus Bowser, and the hero's journey to save Princess Peach. Visual storytelling in the land is clearly signaled by the highly themed environment that surrounds guests on all sides, separating them from the outside world. In those first moments upon entering the land, the guest may have a genuine sense of feeling truly immersed in the Mushroom Kingdom. However, the level of immersion steadily diminishes from this point on. While the visual environment is all-encompassing, and the guest does have the opportunity to engage all five senses within the world, the story is where this experience disengages. It is important to note here, that guest immersion must be considered through both lenses
of the theme park and a video game, as there is a significant difference. From a theme park perspective, the guest is able to be immersed in the land and become a part of Mario’s story. In this way, the theme park is successful. However, the guest is not the main character. To reiterate, in a video game, the player takes on an active role and becomes the main character, bringing the story to a heightened level of reality. (Lebowitz, 2012) In Super Mario World, the guest (or player) has entered Mario’s story, not their own. The guests’ role is then immediately limited and passivized as it is secondary to Mario’s. The guests can enjoy the world around them, but they cannot take on a lead role to play the game as their own individual adventure. The guest is not given autonomy or agency to affect their experience or change the story beyond that which is already structured by the design of the land. This is the key shortfall in video game attractions and themed lands as they currently exist.
CHAPTER TWO: PROPOSAL FOR AUTHENTIC GAME PLAY AND
STORYTELLING IN A THEMED LAND

To combat the shortfalls of existing video game themed experiences and environments, a new model must be designed with the “player 1” guest experience at the center of all design choices. The design solution presented by this thesis begins with a broad consideration of guest experience as it relates to a land as a whole and then narrows into detailed individual interactions. Beginning with a semi-open world for guests, (henceforth referred to as players), in which they can explore at their own pace and direction, immediately provides opportunity for player autonomy and variations in individual experience, resulting in high repeatability which is critical to theme park longevity. The player is allowed to explore at their own will, as they would within an open world video game, and the story then becomes their own. It is unique to the player. There is not a single linear storyline that must be followed in order to complete the story or make sense of the experience. The stage is set from the moment the player enters the world and chooses where to go. Each decision the player makes from this point on will weave a unique narrative that propels them through the land, allowing them to build upon their character and inventory as they take on challenges in the form of interactive attractions and side quests. A player’s story will become increasingly more individualized the longer they play through the land, bolstering their character stats and changing the possible outcomes of the attractions based on their current status.
The Open World

“The open world…is a space in which the player is given more respect and more sense of control within the world. Instead of predetermining the action, the player is asked to explore” (Lukas, 2012, p. 57). In his 2012 text The Immersive Worlds Handbook, Lukas suggests that the open worlds of video games could be used as inspiration for themed environment design. While a truly open-world design would not be achievable, as the physical world has its limits, providing a semi-open world for guests to explore creates the opportunity to give players more decision-making power to directly affect and actively participate in the story that is being told by the themed world around them. In an open world video game, the player has the option to explore any part of the map they wish from the beginning, even if that means running straight to the final boss fight. However, that boss fight will be exponentially more difficult, and likely near impossible, without having spent any time developing one’s character skills and inventory to be aptly prepared for such a battle. This same method can be applied to a theme park land design.

In the semi-open world of a theme park land, players will be allowed to participate in the attractions and interactive experiences in any order they choose, just as they can within any existing theme park. However, the time that they spend in the land building their profile will directly affect their experience within the attractions. The land design proposed, as seen in Figure 1, will incorporate common theme park land components with room for future expansion. These components include an E-Ticket attraction, a live show, a smaller family attraction, retail, food & beverage, interactive
carts and kiosks interspersed throughout, and a central hub for further play and interactives. Each component will present an interactive challenge for the player to overcome and subsequently gain from. While the components may be played through in any order, there will be a cadence of increasing difficulty that will entice but not restrict the player to work from easiest to hardest.

![Figure 1: Land Site Plan. Alexandria Marcello, 2022.](image)

For example, the smaller family attraction is considered level 1, in which the player can most easily gain experience points (XP) and collect items by completing the challenge. Progressing to the live show at level 2, the player will find it more manageable to achieve a successful outcome if they have already completed the level 1 attraction, and even greater chances of success if they have played through any of the side quests in the land. The E-ticket will then represent level 3, the final boss fight, and the most difficult to complete without prior preparation, along with the potential for failure as
players attempt to “beat the game.” As the land model proposed is merely a template for what an open world theme park land may look like, it is important to note that levels do not have to be limited to only three, and the order of difficulty may be adapted to fit any guest experience that the IP or designer wishes to create.

Between the main levels, or attractions, there is opportunity for additional play and development of one’s character and inventory that reciprocally serves to disperse guest flow, mitigating bottlenecks or long queues. These in between experiences can be achieved by leveraging what would typically be passive experiences such as dining or retail and adding interactive elements to them, throughout the land. These optional interactive experiences would equate to a side quest in a video game. These side quests will further increase the uniqueness of each player’s story while also providing entertainment beyond the main attractions. As Lebowitz (2015) states:

Games create a framework that can be used to let players make important decisions and change the progression and outcome of the story. And even if the main story itself remains unchangeable, interaction has other advantages. The addition of optional side-quests...gives the player the chance to pursue other tasks and quests that although not vital to the main plot can be used to provide additional details and expand on the world and story” (p. 42).

With the attractions and all the spaces in between acting as opportunities for interactive story and player development, the open world game play model allows players to experience the land at one’s own pace and create a story that is completely unique to oneself. How that story unfolds and to what extent, will then be determined by the
degree to which players engage with interactives throughout, informing the overall guest experience.

**Guest Flow and Experience**

The guest experience will be created and guided by a combination of interactive challenges and player autonomy. From the moment players enter the gate, they will be presented with the ability to make decisions that directly affect their overall experience. The initial decision the guest will be faced with upon entering the land is active or passive play. To avoid limiting or alienating guests who do not wish to take an active role within the land, the option to remain a passive participant will be available. This will allow guests to remain guests, rather than becoming a player, and move through the land and attractions as one would in a typical theme park. Essentially, they become Non-Playable Characters, or NPCs, that do not directly affect the story, but simply exist within the game. For those who do choose to play, their autonomy will be facilitated through a wearable, interactive wristband that acts as a guide for players, and is then supplemented with an app for additional profile storage and play. As Raffe et al. (2015) suggest, “there would need to be a means of associating a player’s recorded subjective data with their physical presence in the game environment...” A potential solution for which, is presented in the form of an RFID bracelet that can track players’ progress (p. 508). Real-world examples of this can be found in the Power Bands utilized in Super Nintendo World, Disney Magic Bands, and the Tapu-Tapu wristbands at Universal’s Volcano Bay waterpark. This thesis will explore increasing the interface and capability of
these existing RFID bands in order to more closely mimic the user interface (UI) of a video game. The touch screen wristband will be capable of setting up the initial player profile, sending prompt messages when the player is near an opportunity, and tapping into all interactives throughout the land.

Upon receipt of the interactive wristband guide, active players will choose their level of play, at easy, medium, hard, and hardest, all of which will provide varying experiences and level of difficulty with every interactive element of the land and attractions. By choosing a difficulty, players are in control of the level of ease with which they can move through the land and accomplish challenges within their game, just as one would do in a video game. The harder the level one chooses, the bigger the payoff when completing a challenge. However, there will also be greater chance of failure, which in turn contributes to repeatability, as players will return to overcome the challenge that they failed. Repeat plays will also present opportunities to gather more resources and further increase one’s skill.

Once a level is chosen, players will have the option to either log in to an app or tap into one of the interactive kiosks interspersed throughout the land, should they prefer to further detail their profile and find additional interactive play options. Otherwise, the player is ready to begin their game. As Lebowitz (2015) states, “a game needs to provide the player with something entertaining to do besides merely watching the story unfold. As a result, video games tend to focus on fighting and strategy, exploration, puzzle solving, or some combination of the three” (p. 44). These traditional elements of video game play will be instantly accessible to players from the moment their game
begins. The open world design will allow players to explore the world they’ve entered and make discoveries as they encounter elements of the land. Fighting and strategy will come into play with the challenges presented in the attractions, friendly competition among players to earn the most points and highest rank on leader boards, and the collection of items (physical and digital) to bolster one’s profile and increase proficiency. Items collected in a player’s inventory will act as essential tools for battle, health and stamina replenishment, and bartering. Puzzles will be woven into the side quests throughout the land enticing players to explore every nook and cranny of the environment. Access to certain experiences will be “locked,” in which case the player will have to complete tasks or collect specific inventory in order to “unlock” the next level of experience, which further prompts holistic play throughout the land, to supplement the main storyline of the attractions.

All experiences throughout the land will ultimately prepare the player and lead to the final boss fight, in the form of an E-Ticket attraction. E-ticket, as used here, being an industry term originating from the attraction ticketing system of Disneyland, which designated the most popular attractions with the largest draws (DiCologero, 2021). As previously mentioned, in the open world model, guests will be able to participate in the boss fight attraction at any given time during their play. However, should they choose to go straight to the boss fight without any preparation, it will be nearly impossible to defeat their foe. Conversely, if a player has spent ample amount of time in the land gaining experience, completing challenges (other attractions), and collecting inventory, their chances of defeating the boss will significantly increase. No two players should ever
have identical experiences, as the outcome of their game is directly determined by the individual choices they have made.

**Interactives Overview**

Game play throughout the land and leading to the E-ticket boss fight can be facilitated by various interactive opportunities, made possible by the RFID wristband provided to players. Essentially, the goal of this design is to make as many elements in the land as possible interactive, surpassing what currently exists in theme parks, resulting in more variability in experience, and giving the guests a heightened sense of agency in this setting. Super Nintendo World has pushed the envelope with interactive capabilities in a theme park land already, adding interactive show moments to food and beverage, within attraction queues, and the introduction of side-quests (Nintendo, 2020). Using these experiences as a starting point, this concept will explore taking the level of interactivity further, to better support game play in the physical environment.

**Wristbands**

Wearable wristbands will act as a guide for players throughout the land, while also allowing players to “tap” into interactive experiences. As previously mentioned, the precedent for use of wearable wristbands has been established by world-class theme parks such as Disney and Universal (among others), however, the level of interactivity is extremely limited and underutilized. It is worth noting as well that opportunities for non-wearable interactive apparatus could be relevant to future theme park experiences, such as the wands used in the Wizarding World of Harry Potter. However, for the focus
of this design solution, a wearable element that does not pose the risk of being lost or dropped is ideal, in order to most efficiently encompass any and all experiences within a theme park.

The latest development in interactive wristbands that has been announced publicly is Magic Band +, which is slated to roll out in 2022 as part of Disney World’s 50th anniversary celebration. Disney is marketing this new wristband with elevated interactive capabilities including a touch screen interface, customizable color changing lights, haptics, and gesture recognition, in addition to the standard Magic Band capabilities that store guest information (Disney, 2022). These innovations in wristband technology are a step in the right direction, however they are not specifically geared toward game play, and thus, can be expanded upon. Universal’s Power Band is next in line as the most state-of-the-art wristband, as it relates to game play and interactivity in a theme park, released in 2021 with the opening of Super Nintendo World. The Power Band is specifically geared toward interactive game play within the land. USJ’s website touts the Power Band as being capable of interactive challenges, linking to the official app to see score, coins and digital stamps, accessing game data at checkpoints, and for use beyond the park in actual Nintendo video games as an amiibo (Universal Studios, 2021). The Power Band does not include a screen. Less directly related, and most limited but still relevant, is the Tapu-Tapu wristband utilized by Volcano Bay waterpark. This wristband provides a screen for guests that displays wait times, and allows for virtual queuing, with the capability to send messages with haptics for guest notifications.
The key function of this wristband is the capability to communicate with guests in real time, which the Power and Magic Bands do not currently do.

Proposing a combination of these three wristbands with a focus on game play, along with innovations in technology, would in theory, land a new wristband model somewhere in between the capabilities of a Tapu-Tapu and a smart watch, to provide a heightened level of interactivity for players. This “new” wristband’s functions serve three main purposes. First, to track player profile stats and data for personalization. Second, to interact with digital and physical elements within the theme park to enhance play. And third, to communicate with players in real time based on data collected, in order to prompt specific game play or movement throughout the park. With these capabilities of existing technology combined into one new wearable band, the player 1 experience can then be realized.

The wristband technology developed by Accesso Technology Group is a prime subject for the basis of the updated wristband UI proposed. With over twenty years as an industry leader and an existing producer of theme park wristband and application software, it would be ideal to build upon and customize this proven technology to achieve the desired outcome for a video game adaptation (Accesso Team, 2021). In tandem with an app, the wristband has the capability to gain guest insights, send personalized push notifications for proximity based marketing, store guest info for ease of access and purchases, and eliminate friction points through virtual queuing (Accesso Technology Group, 2022). Add to these existing capabilities haptics, gesture
recognition, and the ability to activate interactive elements within a theme park, and this wristband is ready for gameplay.

**Mobile Applications**

As Emma Jones, Head of Marketing at Attractions.io states, “With the rise of mobile apps and their ability to create interfaces with guests, [apps] can provide an enriched experience” (Staff, 2021, p. 84). To enrich the guest experience and supplement the limitations of wristbands it has become common practice in theme parks to leverage the capability of smart device applications for a more thorough experience and ease of use. Continuing with the case study of Super Nintendo World, the USJ app acts as an extension for profile data storage, leaderboards in which players can achieve rankings, and a map of activities. When considering the UI of a video game however, the capabilities of this app are extremely limited. By providing an app with UI adapted from video games, play can be extended to the mobile device, and enhance the overall experience.

As theme park apps are currently built to sync with wristbands for extended capability, it is sensible to then extend play into the app as well, to provide a more fully immersive, gamified experience. The design solution proposed in this thesis, is to add features to the existing smart phone theme park application model, such as in-app optional mini games to boost player stats and inventory, and Augmented Reality (AR) capability akin to that of *Pokemon Go* that further blurs the lines of game and reality by overlaying digital entities into the physical space via a screen. These play extensions
would be accessible only within the bounds of the park, as the app utilizes location services in the device, a practice already leveraged by mobile apps for virtual queues in theme parks. Additional location based gameplay could be added to the app, allowing players to access specific games outside of the park, extending the experience into everyday life, keeping the world alive and relevant even when guests are not physically present in the park. Utilizing location based play will provide the designers with control over what guests can and can’t experience in and out of the park, in order to achieve balance between play and attendance. In theory, one should not discourage or diminish appeal of the other; the in-park play and out-of-park play are complementary, not competitive.

As video games are not limited by physics and other guiding principals of reality, it is practical to utilize technology to expand upon the tangible environment surrounding the players in order to create a more immersive experience. Augmented Reality (AR) technology provides a promising solution for this. Unlike Virtual Reality (VR) which requires the user to don wearable and often tethered apparatus, completely obscuring one’s view to create a 360 degree virtual environment, AR allows the use of various apparatus to overlay virtual elements on the existing environment from the user’s point of view (Software Testing Help, 2022). Within a theme park, it is not reasonable or sensible to obscure the guest or player's view of the physical environment around them. Guests need to be able to move freely through the space with awareness of their surroundings, and without visual obstruction. Additionally, immersing a guest in a VR environment would neglect the visual storytelling of the physical environment. AR allows
the guest to view and experience the physical environment, and further complements that space with digital overlays of elements that might not be physically feasible, through the use of screens such as phones, smart glasses, or other wearable apparatus, all of which are optional to use.

An app with built-in AR would provide players the opportunity to collect inventory unavailable in the physical realm, interact with other players through the use of multiplayer platforms, and activate physical elements that are programmed to respond to the app for increased interactivity. This also increases the player’s autonomy, as the app interactivity presents additional opportunities to make choices that will directly affect the player’s experience, physically and digitally. The use of AR or mixed reality simultaneously proposes potential benefits to the functionality of the park itself, as Eddy et al. suggest “these experiences have lower overhead cost than the mega-attractions, distribute guests in the parks and divert them from high traffic areas, and encourage repeat visitation by sparking guests’ desire to complete…quests” (p. 40).

Checkpoint Kiosks

While mobile apps can be a useful tool for enhancing gameplay and accessibility, making apps a requirement to access park experiences can, in turn, present limitations to accessibility, as not every guest will have or use a smart device. Super Nintendo World’s solution for guests that do not wish to use an app, is checkpoints throughout the land that interface with the Power-Up Band allowing guests to check their profile and inventory. Taking this concept to the next level, it is proposed that these checkpoints
further include game play, and pay-offs that are specific to each location, facilitating side quests, and enticing guests to visit each one as they travel around the park. An in-game likeness would be the shrines used in the *Legend of Zelda: Breath of the Wild*.

In addition to providing a screen at which players may pull up their profile and access their stats and inventory along with leaderboard postings and other information, these interactive checkpoint kiosks will provide optional, additional story elements and game play. Referring back to earlier discussion of side quests, it is important to remember that, while not vital to the main plot, they can provide additional details and expand the story overall, thus deepening the level of immersion for players in the theme park (Lebowitz, 2015). By placing these kiosks strategically throughout the land, the interactive elements and storytelling can be used to entertain guests while waiting for other attractions, alleviate crowded areas by prompting players toward less saturated areas, and promote exploration and activation of the land as whole. These kiosks can be themed to fit within a chosen IP style, as seen in the illustrations in Figure 2, which uses *The Legend of Zelda*, *Portal*, and *Metroid* as IP overlay examples.

![Figure 2: Kiosk Overlays. Alexandria Marcello, 2022.](image)
Activating Retail, Food & Beverage

When visiting any theme park retail and dining experiences are typically passive for the guest. While the environments are often still highly themed, the act of dining and purchasing items is not often an extension of the overall story. The exit retail at the end of an attraction does not always expand upon the story of the attraction or engage the guest beyond purchasing merchandise, for example. To gamify the experience and wrap it into the story of the land, further immersing guests in the illusion of a video game, interactive elements can be incorporated into dining and retail experiences, that allows guests to activate their environment and elevate their player status through purchases.

Many video games employ the actions of purchasing or bartering items, collecting currency, and cooking or eating food as a part of the story and play within the game. Practices such as this can be found in popular games like the Super Mario and Legend of Zelda series. By applying this method to in-park retail and dining experiences, and marrying this with the wristband and/or mobile app interface, guests can be given the agency to further affect their in-game story in a theme park. In the general model proposed by this thesis, purchases of real life merchandise or food would register with the interactive wristband or mobile app, and have different benefits for the player. This increased interactivity would reciprocally entice guests to make more in-park purchases and boost revenue for the park. These purchases can be tied to “unlockable” inventory or experiences similar to the business model of a Downloadable Content (DLC) pack for a video game. As DLCs have become a major contributor the
multi-billion dollar video game industry, it is reasonable to surmise that applying the same strategy to theme park retail would result in increased revenue. (Lizardi, 2012).

**Non-Playable Characters**

“Non-playable characters (NPCs) enhance a player’s immersion in a video game. Communications among NPCs create atmosphere and, in some games, are a core element of the gameplay” (Liu et al., 2021). Application of NPCs in the digital realm of play within a theme park land would pose little challenge or innovation as NPCs are an extremely common element in video games. However, the addition of interactive NPCs in the physical world within a theme park would add a layer of immersion and storytelling that further engages the real-life environment and the people within it. How could real people or entities be adapted to NPCs? Who would be an NPC in a theme park environment? To answer this, one must consider, who are the passive participants in the game? The “non-players?” Considering these questions, one can deduce that those who chose not to “play,” park staff, and potentially even wildlife can act as non-playable characters. Having designated the corporeal NPCs, one must then consider how can active players interact with these characters?

As Liu et al. (2021) suggest, “the physical and behavioural characteristics of [NPCs] should emerge as a response to their physical and social environment, as this adds consistency and realism to the simulation while increasing the player’s sense that their decisions are actually consequential” (p.1). Simply put, the NPCs must react in some way to the social cues and prompts of players. This thesis focuses on two ways of
achieving this. First, through the natural interaction of verbal dialogue. Often, NPCs are programmed with scripted responses to facilitate specific interactions and help the player progress in their quest. In this regard, an employee may be provided with a sampling of information, with potential for ad-libbing, that can be shared with players to aid in their quests. The second option for activating NPCs would be through the wristband. Tapping an NPC’s wristband or station can provide a means of exchanging information and inventory, without the need for verbal dialogue. This would be beneficial for example, if an employee is running a merchandise cart and does not have time to slow down the line to talk to players. By offering a tap, they can still provide a valuable interaction, with minimal interruption of operations. Additionally, this would further provide opportunity for variable experience and exploration, as players exchange inventory with the NPCs, thus altering the NPCs inventory so the guest is not guaranteed to find the same items every time. Engaging passive guests who chose not to actively participate in the game presents a challenge, as players would not be able to easily identify passive guests, and passive guests may not want to be disturbed by strangers. As it is also common for NPCs to be completely passive, and simply add to the visual atmosphere in a game, it is reasonable to consider passive guests as passive NPCs. Wildlife could, in theory, be incorporated through the digital interface as NPCs. For example, a guest may be able to purchase seeds to feed birds, or snap a photo of a specific animal in the app to aid in the progress of their game. This last option is significantly more passive than engaging with fellow humans, however, activating as
many real world elements as possible will ultimately enhance the overall illusion and level of immersion, so it should at least be considered.

**Activating Static Props and Scenery**

On the topic of engaging as many elements in a themed park environment as possible, one must carefully consider the static structures and props within the land as an opportunity to engage guests. This has become common practice in theme parks over the last decade, with experiences ranging from themed photo ops, to the interactive wands that are used to activate “magic” within the faux shop fronts and landscapes of the Wizarding World of Harry Potter at Universal, and even interactive quests embedded into themeparks. Dr. Carissa Baker (2016) lists several examples of this type of interactive activation of themed environments at in her study of choices and fan practices in theme parks, stating

At Walt Disney World alone, several physical quest-type attractions are currently running that fit the thematic tendencies of their parks (figure 2): Wilderness Explorers (Disney's Animal Kingdom), a fully physical, educational game with scout-style badges; Agent P’s World Showcase Adventure (Epcot), a spy-type adventure utilizing a cell phone interface; A Pirate’s Adventure (Magic Kingdom), a mostly physical treasure hunt with special effects; and Sorcerers of the Magic Kingdom, an integration of physical sets and technological mediation. While this is clearly not a new concept, is it worth noting that in a video game themed land where the goal is to gamify the experience as much as possible, it would be
beneficial to make physical architecture, props, and décor dynamic and able to be activated, whether it be by a physical action such as pushing a button, or digitally by reacting to a wristband or app. The activation of the physical environment then becomes a dynamic part of main story or side quests presented throughout the land, adding to the immersiveness of the experience.

Players in the design solution presented by this thesis will be able to activate structures and props within the land utilizing physical triggers, wristband prompts, and controls within the mobile app in order to progress and complete challenges. These activations would then reflect in the player’s profile, adding to player experience, inventory, and skill level. What sets this apart from similar existing experiences, is the fuller integration of physical environment with digital game play and data collection. Interactive games like this in the Disney have been added to preexisting spaces, which limits the extent to which they can be integrated, as they are not custom built. Interactive experiences like the wand magic at Universal are isolated instances that are not integrated with any gameplay.

The most relevant existing example of quest-style, physical, interactive, environmental game play in a park is of course, the key challenge at Super Nintendo World, which makes it a suitable system to expand upon, with its predecessors kept in mind. Guests are challenged to complete tasks in the land through interactive play like punching blocks, in order to collect keys that will then allow them to fight Bowser Jr. (Universal Studios, 2021). How this thesis proposes to expand upon this model is by way of increasing the number of interactive opportunities in a land with multiple side
quests and storylines to follow rather than a single storyline and objective, and
incorporating additional means of interaction through the use of a mobile app and AR
for variable experiences.

**Queues & Attractions**

Theme parks have evolved over the years from passive guests experiences to
more interactive opportunities that transform guests into active participants. This
evolution has expanded beyond theme park lands and attractions, spilling over into the
queues. As theme parks continue to grow and evolve with the critical need to
consistently enhance the guest experience, it is no wonder that queues, arguably the
most passive and unstimulating experience in a theme park, are finally being more
thoughtfully designed to better hold guests’ attention during long waits. Now, many
interactive elements and games are being added to queues, transforming these spaces
into active elements within the overall attraction story (Baker 2016). Surprisingly, the
queues in Super Nitendo World do not offer much interaction or play opportunity for
guests. There are active storytelling moments and stunning design elements that further
support the stories through the queue spaces, such as pre-show videos and themed
rooms with IP specific props and scenery. But play essentially stops in the queue and
resumes at the attraction load. Similar queue experiences can be found in other parks
as well, such as Gringotts at Universal Studios Florida, and the Avatar attraction queues
at Disney’s Animal Kingdom. While they are visually impressive, and do enhance the
space through visual storytelling, they do not provide opportunities for guests to actively
participate in the game play or story. The Rise of the Resistance queue at Disney’s Galaxy’s Edge, and The Fast and Furious queue at Universal Orlando take the visually stunning queue spaces to the next level with live interactions, in which cast or team members actively converse with guests to enhance the story and create some variance in experience. However, this still does not present the opportunity for play.

By integrating more elaborate show moments to enhance storytelling, and adding interactive game play within the queues, passive guests can become players. This has been attempted in the past with attraction queues such as Space Mountain, having a simple Atari-style shooting game baked into the queue, and EPCOT’s Soarin which has added trivia to the queue that guests can use a mobile app to participate in. Taking this old format, and updating it with the latest technology, in tandem with the current standard of themed environments in queues, this thesis proposes a more fully immersive space and active experience through the queues that continues seamlessly into the attraction play. Through the utilization of the RFID wristbands, mobile applications, and AR facilitated by mobile devices and potentially even wearable apparatus like glasses, guests can be given the opportunity to continue to play within the queue space, and benefit from the experiences in the queue, with specific items and other rewards that can only be found or achieved in these spaces. This opportunity for play in the queue will further entice guests to participate in the attractions, and alleviate the pain of long waits.
E-Ticket Overview

Perhaps the most comprehensive immersive element of this themed land proposal is the E-ticket boss fight attraction, which encompasses all of the game play interactives into one experience. The E-ticket attraction proposed here is based on existing technology and experiences using the coaster-dark ride hybrid model, such as *The Mummy* or *Space Mountain*. This attraction design builds upon and enhances this model by incorporating AR and video game mechanics to facilitate play throughout the experience. The player will have the ability to affect elements in the attraction through play and have individualized interactions with the environment, characters, and story based on recognition of and adaptation to their player profiles stored within the RFID wristbands. A player’s level, XP, inventory, and skill will directly affect the outcome of their experience, and ultimately empower the player to win or lose. Figure 3 illustrates the proposed layout of the attraction queue, ground and upper floors.

Figure 3: *Dark Ride Floor Plans*. Alexandria Marcello, 2022.
**Story Overview**

As is common practice in video game storytelling, there is typically a powerful and challenging final boss that a player must defeat to beat the game. In the context of this theme park land design, the E-ticket is the penultimate experience in the land, and thus its story and play will parallel that of a final boss fight in a video game. This general framework for story and play lends itself to be easily adapted or overlayed with a myriad of video game IPs, giving the real-world designers and fabricators a wide range of options for themeing and implementation in theme parks.

Players are first introduced to the story as they enter the land and are cued by the physical environment, engaging the senses of sight, sound, smell, and touch. The E-ticket attraction being the largest and most elaborate structure make it a focal point in the land, visually drawing attention and intrigue from all who enter. As guests venture deeper into the land and begin to interact with different elements, the story will unfold through dialogue, game play, and context clues, such as music or atmosphere becoming more ominous the closer one gets to the E-ticket entrance. It will be the player’s responsibility to gather information and figure out how to complete challenges and best prepare for the final boss fight, just as one would in an open world video game, without a linear storyline. The amount of challenges and quests a player completes, and the amount of experience and inventory that they gather will directly influence to what extent they are able to understand, affect, and complete the E-ticket challenge. For example, side quests or inventory gained from other attractions can provide tips and tricks to help the player in the final fight or inflict more damage to their foe. This will
entice players to experience as much of the story as possible before making their way to the big battle, and ultimately, influence whether the player will win or lose in the final battle, creating the opportunity for variable and repeat experiences. It is important to note that a player winning or losing does not exclude them from the overall experience of the boss battle, but actually alters the outcome and difficulty of the fight, as well as the benefits or damage they sustain in the game.

Queue

As previously discussed, game play and interactives will continue through the queue, making it not only an enjoyable, but necessary part of the E-ticket experience. As is typical in many video games, such as Super Mario, Portal, The Legend of Zelda to name a few, the final boss is not sitting out in the open for a player to walk right up to. The boss is often protected by a maze of puzzles and obstacles that a player must overcome in order to reach the final battle. The queue for this attraction will represent the final level for players to overcome before their ultimate battle. The queue will be comprised of highly themed physical spaces, show moments that entertain guests while enhancing the story, and interactive game elements that allow players one last chance to improve their status before the fight. For the purpose of clarity, The Legend of Zelda will be used as an overlay example to detail the story and experience.

The queue begins outside the attraction, as players enter along the side of the building through a landscape determined by the IP overlay, whether it be mountains, an industrial foundry, or an alien planet, the possibilities are endless. This landscape
serve to enhance the simulated environment, and also obstruct views of the ride box in
which the attraction is housed, through a combination of dimensional sets and flats.
Using *The Legend of Zelda* overlay, this exterior, linear queue (Scene 01) introduces
players to the setting of the mountains surrounding the castle, implying that the space is
guarded and not easily penetrable. Environmental design details provide further context
of the experience players are approaching. Remnants of previous battles, ruins lining
the base of the mountains, and etchings in the rockwork clue players into the idea of the
obstacles ahead that must be overcome. As players transition to the interior queue
(Scene 02), the tone is set by the highly themed physical environment, a secret tunnel
leading to the heart of the castle. A continuation of the linear queueing pattern allows
players time to study and understand the setting. Messages from their “guide”
(wristband) will provide extra context and prompts as they move through the space, just
as Navi or Midna would provide context in their respective *Zelda* games. Entering into
the next room (Scene 03), players are faced with an audio-visual show moment that
provides important story exposition and clues for how to defeat the boss. Until this point,
players are passive participants in order to allow time for story and environment
absorption. This scene provides a transition from the secret tunnel into the castle. While
still in the depths of the mountains, this show moment will utilize a known character
such as a Goron either as an animated figure or technical illusion, to warn players of the
dire situation and the challenges ahead. This Goron friend will provide its exposition and
then open the passage into the castle for players to move forward.
Players enter the next room (Scene 04) where the walls clearly change to stonework implying that they have entered a hidden castle corridor. Here, play opportunities are introduced. An audio-visual show moment combined with physical sets prompt players to use their wristbands or mobile apps to activate interactives in the room that help them practice skills that will be used in the boss battle. The nature of this play mechanic would be determined by the IP, equating to something like using the wristband to guide a digital object across a screen to a goal or shooting objects on the screen using the wristband or mobile app gesture tracking. This room will close for a designated amount of time, based on timing studies, allowing guests to practice, and also be pulsed through the queue giving the attraction operators control over guest flow.

As doors open to reveal the next space (Scene 05), players venture deeper into the castle, as the space becomes increasingly ominous, through another highly themed linear queue space, with potential for hidden interactives, or “easter eggs,” that guests may find if they know to what to look for. A crack in the wall or a change in pattern of texture on the floor will prompt players to tap their wristbands or use the AR viewer in the mobile application to reveal hidden secrets. This opportunity may be missed completely by players who are unaware of what to look for, creating a greater level of challenge in this space.

Queue Scene 06 will empty players into another show moment, with a chance for them to interact with a live character actor. This character would be one that players would expect to find in the castle, such as a guard, prompting specific dialogue and story exposition. Initially the guard will be surprised and cold toward the uninvited
guests. However, they will quickly explain that the castle has not been the same since Ganondorf (the villain) took over, and if it is the players’ intention to stop him, then this guard has no problem letting them advance. Knowing the ins and outs of the castle by heart, the guard gives players crucial information for how to reach Ganondorf’s hidden chamber, and some hints as how to defeat him. This actor will have access to controls that affect the physical and digital scenery and be able to send individualized messages or items to players in the room, as an added layer of personal interaction. As with scene 04, this room will open and close with timed durations, based on a timing study to pulse guests at appropriate intervals. As players are released into the next room (Scene 07), they enter another highly themed, linear queuing space, the final castle corridor that allows them to collect items through wristband taps on interactive set pieces as they move through the space, such as treasure chests or mysterious portraits on the walls.

**Pre Show**

Players then arrive in a simple room with stairs and elevators (Scene 08) that will carry them to the pre-show. The pre-show (Scene 09) presents the most elaborate show moment and a final chance to bolster one’s profile before attempting the boss fight. The pre-show will mimic the mini-boss experience from video games, in which a less challenging boss is presented for the player to defeat before being allowed to progress to the final battle, such as Phantom Ganon. The pre-show will begin with a show moment for exposition, giving the players instruction for how to defeat the mini-boss. When the foe appears, players will work together using their wristbands and
mobile devices in concert with physical apparatus baked into the scenery to defeat the enemy within a pre-determined amount of time based on the timing study. This play opportunity will expose players to the mechanics of the boss fight in the attraction, familiarizing them with the strategy and skill needed to defeat the boss, such as key gestures, button pushing, and timing. When the mini-boss is defeated or retreats, a guide will reappear to provide the safety spiel and restore all players’ to full health before opening the doors and sending the players to load into the attraction. The illusion of a foe in the room could be created using effects like a pepper’s ghost, AR apparatus, or projection mapping, which would allow for a friendly guide to appear, then transition to the foe, and transition back to the guide as the foe is defeated.

Main Show

Ride Vehicle. The main attraction will consist of three sections, a coaster, an interactive boss fight, and a dark ride escape, all of which are enhanced with a tethered augmented reality apparatus. From the load platform players will step onto individual motorcycle style ride vehicles (RV), mounted on motion bases. The RVs are connected linearly forming a coaster train of 8 cabins. Each RV includes a tethered, wearable AR apparatus for the rider. The ride vehicle concept is based on a combination of existing RV technology, such as Shanghai Disney’s Tron motorcycle coaster by Vekoma Rides, Busch Gardens Tampa’s Cobra’s Curse spinning coaster by Mack Rides, and Dynamic Attractions’ Dual Power Coaster with motion base technology (Coaster Force 2018), each of which bring a critical aspect of capability to the design.
The motorcycle style RV provides individual guest seating for a personalized experience, with the potential to expand to double seating for team play and to accommodate higher throughput for larger parks. The motion base creates a deeper sense of immersion through simulated motions like pitch, roll, yaw, and heave. And the spinning coaster allows for individual vehicles in a coaster train to move independently of one another in 360 degrees. An innovative and original experience can be created with these capabilities combined into one RV. Pursuing a custom build to adapt the Dual Power Coaster concept to single rider cabins with individual motion bases that can move independently of one another in 360 degrees has the potential to revolutionize the rider experience by varying movement between each rider, resulting in a unique experience for every seat.

To further increase the possibility of unique guest experiences, an AR apparatus is added to each RV, to create a digital overlay for a more immersive environment and play within the attraction. Companies like Figment Productions have found success with integrating Virtual Reality (VR) into coaster experiences, such as Kraken Unleashed at Seaworld Florida, Derren Brown’s Ghost Train at Thorpe Park, and Galactica at Alton Towers (Figment Productions, 2021). Adapting this to AR will allow for the digital and physical environments to merge and create a more realistic and immersive experience for the player. Additionally, AR will allow for individualized game play within the boss fight.

**Phase 1: Coaster.** As guests exit the preshow fully replenished and ready to face the challenge head, they approach the load station and see the coaster train
aligned and ready to board. Each vehicle is themed to replicate a Loftwing, a larger-than-life colorful bird that players will ride into battle. In 50 second intervals, the coaster launches whisking players back outside to fly through the exterior themed landscape. The AR head mounted display (HMD) will overlay additional visual elements to the viewer’s surroundings, enhancing the story and believability of the simulated themed environment. In the players’ augmented reality view, wings of the RV birds will expand and flap alongside riders in real time, as other small foes appear as targets and obstacles to be overcome along the way. Players are racing toward a goal, to reach the final boss’ inner sanctum and do battle. The coaster will rush in, out, over and under the terrain, providing a thrill for the riders before finally reentering the castle from its highest tower, as it slows and transitions into a dark ride experience.

**Phase 2: Dark Ride - Boss Fight.** Players are thrust into an ominous, dark environment deep within the castle, as they slowly approach their destination. Audiovisual cues alert the players that the boss fight is near, as they turn a corner into a cavernous space, and slowly encircle a central mass in the darkness, coming to a suspicious halt, as seen in Figure 4. Practical sets frame media screens that give the illusion of an expansive space, extending the players’ perception of the simulated world around them. Each RV turns inward toward the central mass, and angles upward. Lights illuminate above for a grandiose reveal of the final boss, a physical animated figure poised atop the central structure, ready for battle.
After a moment’s dialogue from Ganondorf, the fight begins. Players are thrust into an AR battle as the animated figure turns from one to the next, lobbing virtual projectiles that will inflict damage unless blocked. Extraneous beasts and debris fly around posing additional challenges for the players to overcome, filling time and space when the animated figure is not directly focused on a player. The media screens surrounding players pose additional threats such as Guardians and other foes in the background that can inflict damage from a distance and must be blocked. Using the RFID wristband’s gesture tracking feature, AR transforms the player’s wristband arm into a weapon that can strike and deflect against the enemy. The creative intent of this AR overlay is dependent on the IP chosen for the experience. It could be a sword, a gun, a punching feature or any number of imaginable options. In this case, a sword and shield would materialize in the players’ hands, as seen in Figure 5, allowing players to bat and block projectiles between themselves and their opponents.
All the while, the motion bases on each of the RVs is moving in response to the experience, creating a heightened sense of thrill and realism. Haptics in the wristband, HMD, and RV are activated when damage is sustained or inflicted. Status bars and other information appear in the players’ line of vision depicting their health, stamina, and progress, as they attempt to defeat the villain. Buttons and levers housed on the ride vehicle present an additional layer of interaction for players, with the ability to trigger unique actions in AR.

At the 50 second mark, the villain will pause for rest or to reload, as darkness falls and back up arrives to aid in the fight. A second coaster train of players arrives, circling the central structure on a second track, and as their RVs turn in and upward toward the enemy, the villain is illuminated again, and the battle resumes with a renewed sense of challenge and urgency. At the end of 2 minutes, the players in the first coaster train will have either won or lost their game, by defeating or failing to defeat the villain in their individual play, as illustrated by the health meters shown in their AR.
display. At this point, if the villain’s health has been drained he has been defeated, and the player has won. If either the player’s health was depleted, or the villain’s health not completely depleted, the player has lost, and will be challenged to try again another time. Players will be alerted to their win or loss by unique audio-visual cues from their individual AR HMD, as the villain once again goes dark at the end of the battle, and resets for the next round. In a last attempt to maintain his power and station in Hyrule Castle, in a show moment intensified by light, sound, and haptics, Ganondorf magically stuns the Loftwings in an unexpected move, and players then experience a surprise drop, as the villain ejects them from the arena. The battle is over, but the ride is not. This moment will simultaneously act as a transitional pause for the second RV train of players, who will receive different audio-visual exposition from their AR HMDs, and their battle will continue for the same duration of 2 minutes as the previous group had, before they are then dropped. The coaster trains continue to alternate arrivals, and drops, in order to maintain the flow of the ride.

**Phase 3: Dark Ride - Escape.** As guests recover from the thrill of the surprise drop in a moment of stillness, Ganondorf’s disembodied voice is heard, filling the space as if through a loudspeaker, swearing vengeance and threatening to never let his enemies escape alive. The room begins to rumble as if it is going to cave in, the haptics and coaster motion bases tremble, as the players realize they must quickly escape or else be trapped beneath the castle forever. The coaster springs to life and jerks forward exiting the battle arena and racing to outrun the walls closing in around the riders. Players will fly through highly themed spaces at high speeds, slowing only for additional
show moments to create the illusion of obstacles and redirection. The story will unfold over eight scenes, utilizing a combination of active physical sets, media, and dark high-speed coaster moments enhanced by the AR overlay. Ultimately, the coaster will elude the danger in the final scene narrowly escaping the closing chambers and returning players to a place of safety, where they will disembark, and exit through the gift shop.
CHAPTER THREE: CONCLUSION

The design solutions presented in this thesis intend to enhance the interactive opportunities in theme parks in order to promote more authentic video game style play, and heightened levels of immersion in theme park environments that are based on video game IPs, while positively impacting guest flow, experience, park revenue and operations. The scholarly and popular reference compiled in this paper alludes to the future of theme parks incorporating more mixed reality, interactive, video game themed spaces and attractions for heightened guest immersion, repeatability, and variability of experiences. By assessing and building upon existing experiences and technologies, this study proposes that guests can be given a unique player 1 experience within a theme park environment, through simulation of open-world game play in a land or park.

The visual and written model that have resulted from this study are intended to be overlayed with any video game IP, utilized in any park, by any company, to varying degrees of scale and complexity. It is the hope of this designer that the research and concept development presented in this thesis promotes innovations in the themed entertainment industry that will support future integration of video game play in theme parks, to transform guests into players with the ability to mold their own individual stories through interaction and play.
APPENDIX:
DESIGN PROPOSAL IMAGERY
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