5-2024

The Space That Tell Stories

Asia Gonzalez

THE SPACES THAT TELL STORIES

A Project Report Submitted to the Faculty of the College of Arts and Humanities
in Partial Fulfillment of the Requirements for the
Degree of Master of Arts
at
Lindenwood University

By

Asia Gonzalez

Saint Charles, Missouri

May 2024

ABSTRACT

Title of Thesis: The spaces that tell stories.

Asia Gonzalez Master of Arts/Game Design, 2024

Thesis Directed by: Jeremiah Ratican

This project focuses on visual storytelling in game design. The primary focus of this project is to create an environment that tells a story through visual exposition and very minimal dialogue or written words. Furthermore, the project studies the ways in which a story can be both a visual and interactive experience.
Keywords: environmental, narrative, storytelling, video game, visual

Table of Contents

List of Figures

Introduction

Digital environments are a subtle yet powerful tool for storytelling, immersion, and gameplay direction. While countless forms of creative entertainment utilize their surroundings to help convey incredibly captivating stories, video games' additional layer of interactivity has taken this concept further. However, more academic studies that focus on the narrative power of these virtual spaces are needed. The few existing studies recognize common narrative frameworks and methodologies that developers use to convey their stories.

This project will examine the environments of established games, focusing on the visuals, mis-en-scene, cinematic, and narrative/storytelling aspects. The project aims to use narrative frameworks to create an environment that tells and immerses the player in a story with very few words.

Literature Review

Videogames have been a unique medium in the entertainment sphere, especially when it comes to telling stories. Unlike its other entertainment counterparts, cinema and literature, the audience becomes an active participant in the narrative rather than a passive witness. Video games add a layer of interactivity that pulls the viewer into their virtual world. Like animation, video games can incorporate various forms of visual media, from written text to cinematic montages (Atkinson & Parsayi, 2020). They further provide incredibly varied levels of sensual engagement that range from minimal haptic response mechanisms to fully immersive environments (Atkinson & Parsayi, 2020). However, the very topic of storytelling and, even more scarcely, environmental storytelling has had scholars, game designers, and players disagree on how games and narratives relate to one another (Jenkins, 2004).

Video game spaces then and now

Video games and their virtual spaces have come a long way since the first video game, T*ennis for Two*. Numerous, graphically, refined environments players enjoy in modern games have significantly evolved since its conception. In their preliminary stages, computer hardware limitations left video games confined to limited spaces with simplified designs (Alvarez & Duarte, 2017). Early game consoles had to fit a few kilobytes of available space for the game logic code and graphics data (Gameplan Compass, 2020). This meant most video games were limited to a black-and-white display (Ahoy & Brown, 2014). The late 1970s saw the emergence of colored graphics, meaning video games could now display a limited color range(Ahoy & Brown, 2014). *Galaxian* is the most well-known example of an RGB color game, and because of its enormous popularity, it is sometimes falsely believed to be the first RGB color game. It received recognition for being able to display a variety of colors at once. (Ahoy & Brown, 2014). However, before *Galaxian*, some the first RGB color games were lesser-known examples, such as *Gotcha*, *Indy 4*, and *Car Polo*, displaying an extremely limited color palette of bright yellows, reds, blues and greens(Ahoy & Brown, 2014).

Despite technological progress, the graphic fidelity of early games still left developers in the 1970s and early 1980s frustrated as they sought to create richer environments (Alvarez & Duarte, 2017). However, this all changed with the breakthrough success of *Zork: The Underground* (Alvarez & Duarte, 2017). Despite not being an utterly visual game, the highly descriptive text of the virtual environment marked a turning point for video games and the ability to make more visually complex worlds (Alvarez& Duarte, 2017). Graphics from early games were rendered in one of two ways: vector or raster. Although less flexible, vectors had the advantage of being

smoother and more accessible to scale and rotate (Ahoy & Brown, 2014; Bogost &Montfort, 2009). Arcade vector games, such as *Star Wars*, *Asteroids*, and *Lunar Lander*, dominated arcades in the early 1980s with smooth visual lines and images (Ahoy & Brown, 2014; Schmidt, 2020). Despite this benefit, raster graphics maintained its dominance since it was more affordable and could produce scenes with greater complexity. (Ahoy & Brown, 2014). Showcasing an entire environment was still a prominent limitation for many at-home consoles and arcade games; game areas were still confined to singular spaces, and scrolling to reveal an area required a lot of processing power and memory (Ahoy & Brown, 2014). Early racing games like *Fire Truck* and *Speed Racer* were the first to showcase the scrolling effect (Ahoy & Brown, 2014). The graphic fidelity of games continued to evolve with the release of the Nintendo Entertainment System (NES) in 1983; this system allowed developers to make more appealing 8-bit sprites, as showcased with *Mario Bros*. (Gameplan Compass, 2020). The NES featured a 54-color color palette with transparency, and it displayed up to twenty-five colors on the screen at once. (Gameplan Compass, 2020). Even though *Mario Bros*. was a 2D-pixelated space with a simple storyline, the side-scroller effect allowed *Mario Bros*. to showcase more complex and imaginative realms. (Jenkin, 2004; Alvarez & Duarte, 2017). Side-scrolling soon became a staple for future iterations, as games were no longer confined to a singular 2D space. It should be noted that the side scroller arose from a constraint of the NES, as the scenery could not be rotated or flipped and could only be moved via complicated procedures. (Gameplan Compass, 2020).

The 16-bit system brought richer vibrant palettes and the capacity to move more pixels, continuing the advancement that the 8-bit systems were unable to do (Ahoy & Brown, 2014; Logo Creative, 2020). Games such as *Space Harrier* and *Hang On* combined smooth scrolling and sprite scaling to simulate depth, an impressive feat for arcade games of the mid-1980s. In the

early 1990s, graphical advances were made with the release of the Super Nintendo Entertainment System (SNES) (Quality Arcades, 2024). The SNES improved upon the NES with a 16-bit processor that worked with two graphic processing units, allowing the console to display up to 256 colors simultaneously (Gameplan Compass, 2020). The chip cartridge on the SNES was also enhanced, providing additional processing power. Designers could produce 3D graphics using 2D objects, as demonstrated in *Mode-7*, which used a form of texture mapping to approximate 3D in 2D settings (Gameplan Compass, 2020; Logo Creative, 2020). Parallax scrolling was also a popular technique to showcase depth in a 2D space; it entailed splitting the background into multiple layers at different frame rates, often moving in tandem with player movement (Ahoy & Brown, 2014). *Moon Patrol* was one of the first games to achieve this feat, with a simple mountain vista approximating depth and movement as the player moved. As the hardware improved, parallax scrolling became commonplace, with games like *Shadow of the Beast* and *Sonic the Hedgehog* displaying strikingly colorful and complex backgrounds (Ahoy & Brown, 2014). The 32-bit system quickly outpaced the 16-bit system with the PlayStation, Sega Saturn, and Atari Jaguar (Wirtz, 2023). Pixelated art soon became obsolete as the industry focused on more 3D graphics. Games ran off CDs instead of cartridges, allowing more storage space for 3D graphics (Ahoy & Brown, 2014). It enabled more complex pre-render backgrounds that *Myst* took full advantage of (Ahoy & Brown, 2014). Showcasing fully rendered 3D backgrounds for a player to traverse. However, the 32-bit reign was short-lived with the release of the Nintendo 64, though the PlayStation remained a popular 32-bit system through this era (Logo Creative, 2020). The Nintendo 64 proved a game changer, including anti-aliasing and realistic texture mapping; however, it still relied on cartridges (Zolotov, 2022). The Nintendo 64 and PlayStation could

render up to 150,000 or more polygons. With these advancements, there was a new demand for the virtual world in 3D (Alvarez & Duarte, 2017).

3D virtual spaces, like 2D game spaces, have had their fair share of intricate graphical problems and constraints. The first iteration of a 3D game was in 1972 with *Maze War*, which marked the first time a player could move from left to right and back and forth while shooting in any direction (Eden &Eden, 2020). Harkening back to the 1980s, games such as *Battle Zone* and *Star Wars* utilized vectors to simulate 3D immersive scenes with a few lines (Ahoy & Brown, 2014). Fast forwarding to the 1990s, VGA graphics offered 256 colors, allowing more dynamic colors to be displayed(Ahoy & Brown, 2014). Some games such as *Alone in the Dark*, combined 2D and 3D graphics to showcase depth. Despite this, they only rendered polygon characters and left the environment as a flat bitmap (Ahoy & Brown, 2014). Unlike its 2D counterpart, which concentrates on either the top-down view or the side-scroller effect, the 3D design emphasizes the camera perspective, which often heavily affects design decisions (Alvarez & Duarte, 2017). First-person viewpoint let the user see the environment through the eyes of a virtual avatar; third-person viewpoint typically employ an overhead camera to show the player how the game character is positioned concerning the outside environment (Alvarez & Duarte, 2017).Finally, the fixed camera viewpoint, is a camera that is placed in a specific area in the environment to showcase a fixed field of view(Alvarez & Duarte, 2017). This is a perspective typically used for cinematic purposes (Alvarez & Duarte, 2017). According to Alvarez and Duarte (2017), early 3D games needed to be more robust to show highly detailed environments. In the mid to late 1990s, some 3D processors were still too underdeveloped to render in high detail; games like *Grand Theft Auto* and *Sims City 2000* still utilized the 2D top-down perspective to mask the lack of graphic detail (Alvarez & Duarte, 2017). Over time, the evolution of 3D Games has become

more graphically sophisticated and spatially complex, with games such as *Wolfenstein*, *Doom*, *Resident Evil*, and *Tomb Raider* (Alvarez & Duarte, 2017; Carson, 2000). *Wolfstein* and *Doom* considerably impacted the first-person shooter genre, using grid maps to allow players to traverse dynamic 3D levels (Ahoy & Brown, 2014). However, they still could not simulate important immersive components. The levels, though intricate, were relatively empty and linear, save for the enemies that populated the area(Ahoy & Brown, 2014; Alvarez & Duarte, 2017). A 1999s game named *Shenmue* introduced an interactive and intricate three-dimensional depiction of Yokosuka, Japan, marking the first significant breakthrough in the industry. Though small, the level simulates a bustling city with interactive environments (Alvarez & Duarte, 2017). *Grand Theft Auto III* was another breakthrough; though less graphically convincing than Shenmue, the city was enormous, with a game world created to provide players complete control over what they do (Alvarez & Duarte, 2017). Video games of the 1970s, 1980s, and 1990s showed fast-paced progress in creating rich and colorful environments, as they were now free to explore the endless bounds of their given environment (Alvarez & Duarte, 2017).

Environmental Storytelling

Environmental storytelling can be a very compelling narrative device for games. Compared to a cinematic sequence, writing, or speaking, the environment can be a less obvious form of relaying a story. However, it does not mean that spaces cannot be linked to narratives (Fernández-Vara, 2011). Like other artistic mediums, digital games require narrativity to imbue generic settings with life and significance (Melnic, 2018).

Nevertheless, there have been plenty of interesting discussions about what makes a game more or less "story-like" from various perspectives (Pearce, 2005). Ludologists, a group of game

theorists including Espen Aarseth, Gonzalo Frasca, Markku Eskelinen, and Jesper Juul, have rallied around the idea that games are not narratives but just games (Ryan, 2006). A substantial part of their argument is centered around the many features of literature and film that do not occur in games (Ryan, 2006). Some arguments made by these Ludologists settle on a couple of main points. First, Games are not narratives, even if they are based on stories; this is because narratives require the presence of narrators and narratees (Ryan, 2006).Second, Games do not allow the rearrangement of events that mark the difference between story and discourse, and all games are chronological; games do not have a fixed order of events, while narratives have a set order (Ryan, 2006).Finally, Games are unable to depict events in the past, whereas narratives must (Ryan, 2006). They do acknowledge that not all games fit these criteria, but they still argue that numerous games still miss the key elements that make them narrative (Ryan, 2006).

Pearce (2007) argues that games should not be looked at in terms of why they are or are not narrative by traditional theoretical definitions but in what ways they are narrative. Pearce (2005) notes that most game narrative roles lie in a gray area, but this is mainly pertaining to board games. Examples such as *Checkers*, *Monopoly*, or *Life* are not inherently narrative in the most traditional sense, but a narrative takes place in an abstract or metaphorical sense (Pearce, 2005). Incorporating digital games adds a few characteristics that set the stage for the role of narratives, especially regarding simulations and interactivity (Juul, 2004, as cited in Pearce, 2005). Ludologists claim that video games are simulations and stories are representations; games must be different every time they are played (Ryan, 2006). However, Ryan (2006) asserts that simulations are transmission devices whose components represent something outside of themselves, meaning that games may not be stories but machines that can generate stories (Ryan, 2006). Pearce (2005) suggests that exploring spatial narratives is one way to unpack narratives in

games, as space and navigation are essential to storytelling. Due to the development of norms for the three-dimensional depiction of space, like isometric maps and real-time 3D, games now more closely resemble architectural storytelling forms, like theme parks and cathedrals, than they do traditional narrative forms, like novels and movies (Pearce, 2005).

Environmental storytelling fosters player involvement, investment, and story immersion while promoting proactive problem-solving (Livingston et al., 2014). Livingston et al. (2014) likens environmental storytelling to how museums attempt to provide a story through artifacts. The scholarship surrounding environmental storytelling is particularly sparse; however, a few researchers have definitions and frameworks for defining and using environmental storytelling. Carson (2000) and Pearce (2007) define environmental storytelling as a concept derived from theme parks. Carson (2000) states that the story is integrated into the actual area that visitors walk through and that much is manipulated through an audience's expectations based on the physical world. Pearce (2007) draws parallels between online theme parks and massively multiplayer online games (MMOGs), likening them to a constrained interactive playground. However, the critical difference between the game world and a theme park is agency. Pearce (2007) explains that players of these games can interact with the game world and enact their own agency in a more dynamic way than those who visit Disneyland, which is a regulated environment.

Much of the idea of environmental storytelling relies on the player's immersion and observing/ engaging with the surroundings. Like theme parks, escape rooms are another form of immersive entertainment that follows the same design principles as video games. Immersion is a term used to characterize a sense of presence attained by highlighting gameplay components that enable the

player to focus on the game's story rather than its interface (Atkinson & Parsayi, 2020). There are four vital dimensions of immersion to consider when crafting an immersive experience. Enjoyment: Does the player enjoy their time in this space? Engagement: Is the player mentally engaged in the process? Spatial Presence: Is there awareness in relation to the environment or controller? and Transportation: Is the player immersed in the narrative (Hall, 2020)? Immersive works can be a combination of any quadrant of the Spectrum of Immersion: Audience dependent, which requires interaction or ability to move through space; atmospheric, establishing a mood; Free Standing, which requires audience interaction; and Narrative, establishing a story (Hall, 2022). Escape rooms fall between the atmospheric and audience-dependent quadrants, as their designs require a lot of theming and function based on audience interaction (Hall,2020). Visual narratives are very comparable to escape rooms, as they establish atmospheric immersion and require some level of audience interaction. However, rather than encompassing all quadrants, they only fall on parts of the spectrum; albeit there is some level of flexibility, this is very dependent on the developers' design choices.

Unlike the physical world, immersion in digital space can only go but so far. Inconsistencies in games can remind the player that it is only a game, undermining their suspension of disbelief (Sweetser & Wiles, 2005). Examples, such as objects or enemies clipping through walls, graphical bugs, and scripted events, can break immersion. Even character perspective can significantly affect the level of immersion. Alter biography comes to mind, where interactions with the game world allow players to create a narrative by interpreting events happening in the surroundings and objects (Calleja, 2009). There are two forms of Alter biography: Alter biography of self and Alter biography of entity. Self refers to the first-person perspective, where the player interprets the events in games as happening to them (Calleja, 2009). Examples such as

Call of Duty, *Slime Rancher*, and *Doom* perform Alter biography of self. Alter biography of entity mainly refers to third-person perspective games, where the events are related to the avatar, which the player controls (Calleja, 2009). Essentially, the events that happen to the avatar do not translate as happening to the player(Calleja, 2009). Examples such as *Okami*, *Tomb Raider*, and *Sims* perform Alter biography of the entity.

There is also the matter of Aesthetic Contemplation when considering narratives in visual environments. In traditional art, aesthetic contemplation allows viewers to take in what they see (Atkinson & Parsayi, 2020). Visual narratives, much like escape rooms, are, again, dependent on optical engagement. In game design, aesthetic contemplation depends on the purpose of the game. Video games are in quite a unique predicament because of the interactive aspect of fostering a balance between gameplay and aesthetics (Atkinson & Parsayi, 2020). Games that lean more toward gameplay aspects, such as first-person shooters or racing games like *Gears of War* and *Mario Kart*, often use the environment as a backdrop for some level of immersion. However, it is not to say that aesthetic contemplation cannot occur in these instances, though it is based on the player's free will. In the case of *Gears of War*, there are down points within the level that allow players to look around unencumbered by flying bullets. Those moments, however, are exceedingly rare. The primary function of *Gears of War* is combat, and if a player were to contemplate mid-battle, it could result in the loss of life or time. Games that foster aesthetic contemplation are Open World and Sand Box, such as *Skyrim*, *Breath of the Wild*, *Dear Ester*, and *Aporia*. Though combat elements exist in some of these games, they do not take away a player's ability to observe the surrounding world, and they often reward it.

When pursuing an immersive experience, the arrangement of an item in the scene can be used to reinforce immersion, narrative, emotions, or even psychological factors (Logas & Muller, 2005). A term derived from films, the mis-en-scene is defined as using spaces within the frame (Koliker 1999, as cited in Logas & Muller, 2005). In film, this can include lighting, costumes, actors, and set design (Guardiola & Natkin, 2017). In video games, this includes voice actors, lighting camera parameters, animation, sound, and game environmental design (Guardiola & Natkin, 2017). However, the mis-en-scene in games is not limited to be purely visual; among the tools used in game design's mise-en-scene list can also include rules, interaction design, learning curves, difficulty management, real-time rendering, signals and feedback, and any other components that let the player have the desired experience (Guardiola & Natkin, 2017). Logas and Muller (2005) state that to understand the mise-en-scene, one must understand its use in film. Logas and Muller (2005) use the horror film *The Shining* as an example. They examine specific elements, such as lighting and the position of the lighting, as they reflect a particular atmosphere or highlight the deterioration of Jack's mental state. There is also mention of the set design and how it creates a sense of foreboding by making the Overlook Hotel mountainous compared to the VW Beetle as it drives up (Logas & Muller, 2005). All these elements of the mis-en-scene contribute to the broader story in subtle detail.

Narrative Architecture

Further analysis of environmental storytelling and spatial design involves narrative architecture. Before explaining further, defining architectural narrative in its traditional form outside of game design is crucial to its comprehension. In the simplest terms, narrative architecture is defined as a told story through its materials and immaterials. This can be an arrangement of spaces, colors, light systems, etc. (Mascio & Maver, 2014). Mascio and Maver (2014) state that the story can be

intentional with hints given by the designer, but sometimes, the viewer, with varied degrees of freedom, can interpret the story in diverse ways that the architect did not intend. Carson's (2000) and Pearce's (2007) definitions of environmental storytelling and the mis-en-scene resemble what defines narrative architecture in that the arrangement of the components in these spaces contribute to the overall story. Jenkins (2004) categorizes environmental storytelling in four ways: evocative spaces, enacting stories, embedded narratives, and emergent narratives. Jenkins (2004) states that game designers do not just tell stories; they design and sculpt worlds.

Evocating spaces, mostly like theme parks, build upon the preexisting knowledge of stories and genres of the visitor (Carson, 2000; Jenkins, 2004). They are games that adapt preexisting stories. Jenkins (2004) gives the example of *American McGee's Alice*, an *Alice in Wonderland* game adaptation. There are many more examples, such as *Simpson Hit and Run*, *Middle Earth: Shadow of Mordor*, and *Kung Fu Panda*.

Enacting stories allows players to participate in, perform in, or see story events (Jenkins, 2004). Jenkins (2004) states that these types of stories appear in games on two levels: broadly defined goals or conflicts and localized incidents. Examples of this can be the player powering up, dialogue trees, or having the player pick and physically examine an object. In terms of spatial stories, Jenkins (2004) explains that they respond to different aesthetic principles by emphasizing spatial exploration over plot development. An example of an enacting narrative is the analysis by Dubbleman (2016) of *Papers, Please*. The core mechanics of *Papers, Please* is to check the papers and the people at the checkpoint(Dubbleman, 2016). The choices the player makes affects not only the player, but also the status of the country and their family (Dubbleman, 2016). One

example is if the player allows too many bad people in the country, it leads to the deterioration of the country and thus the player's ability to take care of their family (Dubbleman, 2016).

Emergent Narratives enable viewers to construct their own stories and interpretations. Jenkins (2004) states that emergent narratives are not predetermined, but they are also not chaotic. This type of narrative is commonly found in the sandbox game space, where the developers give the player a set of tools to interact with, such as *Sims*, *Garry's Mod*, and *Minecraft*.

Embedded narratives, as Jenkins (2004) explains, are predetermined narratives where narrative comprehension is an active process for the viewer to break down and interpret the story with cues given by the author. Some games use cut scenes to engage viewers in the story's premise, while others use spaces to engage viewers. This form of narrative bears a similar idea to Livingston et al.'s (2016) comparison between environmental storytelling and archeology. It is up to the players to draw the connections necessary to uncover the narrative the game environment tries to tell (Livingston, 2016). An extensively studied example of an embedded narrative was through the game *Aporia*. According to Bevensee et al. (2012), the story is tailored to make the player uncover the story non-linearly; they use pictorial cues to support the narrative, i.e., drawing and cave painting, each being more abstract with each reveal. However, *Aporia* is not entirely an embedded narrative, as it has emergent and evoking narrative aspects (Bevensee et al., 2012).

Bevensee et al. (2012) conducted two studies on the narrative qualities of *Aporia*. Bevensee et al. (2012) conducted their first study on twenty participants (18 males and 2 females) to see if, regardless of the interruption, the environment was engaging enough to keep the players playing. Three interruptions were done at specific points during each playthrough, and they reported on

the desire to continue after each playthrough (Bevensee et al., 2012). They found that around 85% of participants desired to continue but did not want to play again. This study also considers that Barthes' player types heavily reflect one's desire to continue. Killers have lower engagement after an interruption, and achievers and explorers have high engagement (Bevensee et al., 2012). The second study was conducted to see if players understood the narrative of *Aporia*. After the playthrough, they asked whether they could retell and understand the narrative (Bevensee et al., 2012). Bevensee et al. (2012) found that many participants could not understand the narrative. Some participants understood narrative fragments of the events that occurred through the player. However, four out of twenty participants understood the overall story.

It is important to note that game narrative structures are not confined to a single category. When examining games, we often find a dominant architectural narrative with smaller elements of other narrative architectures. Embedded narrative, however, tends to be the most prevalent architectural narrative in games. A comprehensive study of one hundred games revealed that 61 were classified as embedded, 25 as mixed narratives, and 11 as emergent (Amir, 2019). A more nuanced example is *Aporia*, which features an overarching embedded narrative, but also incorporates some emergent structural narratives. However, these emergent elements could be unintended byproducts, arising from the somewhat ambiguous nature of certain scenes, which encourages players to form their own interpretations of the story (Bevensee et al., 2012).

Semiotics

How semiotics is applied varies among developers; this can entail the UI elements of the object within the 3D space. Semiotics is a methodology derived from Ferdinand de Saussure's Theory of Signs. However, much of what has been stated about environmental storytelling is based on Charles Peirce's philosophy of language. Pierce defines a sign as involving the idea that an object

represents it; this includes three main categories: icons, indexes, and symbols (Peirce, 1998, as cited in Fernández-Vara, 2011). An icon is a signifier that signifies or imitates meaning, paintings, or photos (GDC & Bellard, 2022). In the gamified architectural sense, an example of this relates to the imitation of the design of contemporary casinos in GTA (GDC & Bellard, 2022). An index is the idea or causal link between the signifier and the signified. Smoke: i.e., if there is smoke, there is fire (GDC & Bellard, 2022). A symbol is a sign concerning its object, a social convention (Araujo & Hildebrand, 2019). The meaning must be learned and cannot be figured out by looking at it (Bellard & GDC, 2022). An example would be the power symbol.

The foundation of environmental storytelling is two recurring ideas. First, the tale creates the space, and the player's navigation of it creates the narrative sequence; second, the player must piece the story together by interpreting the objects and occurrences in the area (Fernández-Vara, 2011). These foundational ideas speak to Salen and Zimmerman's (2003) statement of meaningful play: establishing a goal is essential to the game's narrative structure; however, simply having a goal is not enough. The game must also guide the player to the goal to make it genuinely narrative (Salen & Zimmerman, 2003). The question now is how to guide players to the points of interest. For environmental design, games employ architectural signs. Architectural signs are used as navigation through two means: Anticipatory play and Ludic signs (Aroni, 2022). Anticipatory play is the unfolding of events and the anticipation of what to do next; this can take on many meanings based on the type of game.

Aroni (2022) used the example of the vents in *Dues Ex* and *Alien Isolation*. A vent by itself has no meaning, but it can be established as a passageway within the context of gameplay. As with Aroni's (2022) example, the vents in *Deus Ex* and *Alien Isolatio*n are either translated as a means

of escape or a sign of danger. The vent, in this context, is the Ludic sign, which has no fixed meaning (Aroni, 2022). The meaning of the vent changes depending on its presence in each game. Context is critical to the overall creation of meaning. In gameplay, if the sign is not correctly interpreted, the player can lose a life or become lost in a level (Nevia & Romano, 2007). Signs, symbols, and cues combine to immerse the player in a world where signs are constantly interpreted as something else (Nevia & Romano, 2007).

Methodology

For this project, a wide mix of software will be utilized to create the overall environment for *Massacre of the Man-eating fairies*. Maya is the primary source for creating 3D models and animation. However, for the purpose of this project, the modeling function will only be used in the creation of props and foliage. Adobe Substance 3D painter and Photoshop are utilized for the creation of textures for all props and foliage. The ease of transfer between two programs allows great flexibility for creating hyper realistic and stylized textures. Substance 3D Painter can create texture maps for a variety of engines including Unreal Engine 5. Z-Brush will be used to sculpt the finer details that Maya cannot achieve. Z-Brush and Substance painter will be used in tandem for baking high-poly details onto low-poly models for optimization. Unreal 5 is the primary engine platform for this project due to familiarity of software and the advanced visual system. This project is not code heavy, so the blueprint system in Unreal will be used for simple and quick coding for playability. Although Unreal 5 is still relatively new, there is much documentation and video guides of Unreal 5 as well as Unreal 4 that still apply to Unreal 5.

Prior to starting this project an observation and examination was conducted on specific locations within *Red Dead Redemption 2* using the narrative architecture and semiotics. Points of interest are the main source for which these methodologies were applied, as they often appear in a

location where an event has occurred prior to the player's arrival. Points of Interest function as special locations for Arthur to investigate. They do not have much impact on the overall story, but they have their own story for the player to uncover within the world of *Red Dead Redemption 2*.

Brush Fire

Brush Fire is an entirely exterior environment, being a scorched forest of charred trees and burnt soil that is in opposition to the lush greenery that was untouched by the flames. Although it's a small area, a simple story can be uncovered through observation. A simple guiding signifier is applied, via the burnt trees and blackened soil, signifying that a fire took place. However, there is not much indication as to what caused it without further investigation. Going further into the burnt forest, a small encampment can be found with scattered debris, a fire pit and burnt a carriage. Within the wreckage is a small lock box that contains some supplies and a pamphlet for a Volatile Fire Bottle. Though not explicitly stated, the narrative becomes clearer, that this fire bottle was responsible for the blaze. The overall narrative of the Brush Fire is an embedded narrative as it is a preexisting narrative for the player to uncover. The narrative being an unknown person causing a small fire prior to our arrival. However, there are emergent qualities with its open-endedness of how the fire was started. Was it started by accident or on purpose? Looking that the current state of the surroundings and the findable evidence one can infer that the incident was an experiment that had gone wrong. The instruction pamphlet makes this evident, with instructions on how to make the fire bottle. At the conclusion of the initial examination, the narrative that was gathered was: An unknown person set the forest on fire in an experiment gone wrong.

However, what was not made clear was the fate of the person who started the fire. In another round of examination, this question was answered. Although an easily overlooked detail, under the tarp near the wagon a charred corpse can be found. While it does not change the overall narrative of the unknown person starting a fire. It does answer what happened to the person who caused it. It should also be noted that on first observation the cause of the fire was assumed to be the fire pit. However, the placement of the firepit can be misleading as a signifier, as further investigation via opening the box, reveals the Volatile Fire Bottle being the culprit of the fire.

Manmade- Mutant

The manmade-mutant laboratory is another point of interest that bears multiple architectural narratives. At first glance, it appears to be a long-abandoned house overtaken by nature. The lower-story house's doors and windows have been boarded up, making it inaccessible by standard means. It can be implied that whoever boarded the house did not want an outsider entering. Upon further investigation, a single interior room can be accessed through the window on the second story. After entering the room, a deeper narrative is revealed that the exterior environment attempts to hide. When entering, the room appears as a makeshift lab containing a surgical table, medical chart, taxidermy animals, and a hanging Frankenstein monster. Despite the state of the house, the lab looks well-maintained and recently used. At this point, the narrative changes from a simple abandoned house to a house that is used as a front for conducting twisted experiments. The animal monster is a big signifier of the sinister nature of the house, with smaller details adding to the overall narrative, such as the notes and taxidermized animals that have been haphazardly stitched together with different animal parts. The notes provide further context of an unknown person attempting to create a human-animal hybrid. Much like Brush Fire, the overall architectural narrative is an embedded narrative with an enacting

narrative aspect as it presents no conclusive end to the purpose of the mutant. However, another architectural narrative occurs within the environment, evocating space. In some sense, the evocating space narrative is also the overarching architectural narrative as it is a recognizable story of Frankenstein's Monster.

Production/Results

The overall story is embedded in the narrative as the character/ player uncovers the events before their arrival (Jenkins, 2009). However, emergent narratives also occur within the building narrative, as some points will be left up to interpretation. The central premise of *Massacre of the Man-eating Fairies* is a group of college students celebrating graduation in a cabin. However, one of the students finds a storybook locked in the storage room. The student unknowingly releases the fairies upon reading the book, and chaos ensues. The player is a student who arrives late to the party and must uncover what happened to their friends. Even though much of the project is a visual walkthrough, there will be some degree of gameplay. This includes a lock and key mechanic and pick up/interact and read mechanic. The core concept of these gaming functions is to direct players to desired places of interest while also having them take in the surrounding scenery.

The inception of the project was marked by meticulous planning. The first step was to gather a plethora of visual references. Employing PurRef to compile a visual mood board, this served as a guide for the overall art direction of props, architecture, foliage, and lighting. The visual style of the entire project is a clash between realism and stylized. The storybook world of the fairies is meant to engulf the cabin in a lush, whimsical, yet treacherous forest, a visual spectacle that is sure to inspire awe and terror.

The next phase in the project is to block out. The block-out is used to give a general visual approximation of the level's appearance. Using basic shapes like squares, cylinders, spheres, and planes to represent trees, walls, and furniture, little precision is needed at this stage. Multiple walkthroughs were conducted as needed to see the general visual flow of the level. This was mainly done for the interior environment, as much of the visual climax takes place within the cabin.

The brunt of the project took place with modeling and sculpting. 3D mainly uses simple poly primitives to create furniture and props. Curve tools and sweep mesh were used to make low-poly branches, trunks, and roots to simplify and quickly make the trees.

ZBrush was mainly utilized for tree trunk textures, rocks, and complex shapes that could not be done in Maya. The primary purpose is to create a high-poly texture to bake onto the low-poly models. Baking will allow for optimizing high-definition textures onto low-poly models (Figure 1). However, complete retopologizing is required to get a new low-poly model after exporting the high-poly sculpt. Hence, is essential to align and match for baking in Substance Painter (Figure 2). The Final Portion is the meticulous implementation of all models' textures into Unreal 5. This careful approach ensures that every detail of the models' textures and Materials is accurately represented. In some cases, the textures appeared too shiny in the lighting, so a constant node was used to control the roughness.

Three sets of lighting are utilized: point lights, spotlights, and directional lighting. Spotlights were used to set up the rooms for specified effects. Some Spotlight materials in the interior level were made to flicker, adding to the unsettling atmosphere. Point lights were strategically used to light up darker areas that the spotlights may not be able to reach. These are left at a dimmer level to maintain the continuity with the spotlights. Directional light is used to create the environment

lighting. Set at around 65 to 70 degrees, it sets the sun low enough to create darkness. Paired with the Night sky sphere material it creates the Nighttime Forest environment.

Due to time constraints, it was not feasible to make custom particle effects, environmental ground textures, and realistic foliage, so the Quixel bridge plugin was used to gather the necessary exterior textures for the environment. An extensive library has 2k and 4k texture maps of dirt, wood, and grass (Figures 7 and 8).

Megascans Trees: A European Beech pack from the Unreal Marketplace was used to populate the interior environment with wind-affected trees. However, due to the prominent frame rate stutter, the wind speed nodes were kept at a minimum.

The Butterfly and Firefly Particle Effects (Figure 4) from the *Realistic Starter Pack Vol. 2* were primarily used as they fit the storybook whimsicalness aesthetic. The blood splatter particle was to simulate blood dripping for the ceiling in the lower garage area. The speed and frequency were edited to make it look like there was a constant drip.

To help indicate the interactive points of interest the *Korean Traditional Pattern Effect* was used in tandem with the *VFX Variety Pack* as the combined style created a standout effect that differentiated the interactive from the non-interactive objects.

The mechanics were levied to guide the player through the scenes. The idea was to keep them as simple as possible to not distract from the overall visuals. The pickup/ interact mechanic acts as a means of making the player look around and inspect the environment. The notes were implemented to add exposition to what cannot be visually portrayed, such as character thoughts, feelings, or essential information that leads to the next goal. The first note, for example, was placed to guide the player to the garage. It also served as a distraction from observing the cabin. With a closer view, one could observe that the side door is taken over by vines, giving away

significant details. The keypad mechanic adds a layer of realism to the world. By extension, going to the keypad, the player can note the state of the cabin, i.e., the broken glass scattered on the ground and the broken window above the door. There are several moments throughout the interior level where the player can interact with objects. This mechanics adds a level of immersion and realism. Rather than silently observing the environment, the interaction serves as a means of seeing how the player character feels and what they are thinking as it applies to the object.

Conclusion

To reiterate, the goal of this project was to tell a story through the visual environment with little help from dialogue or written exposition. Exploring how visuals facilitate storytelling was successfully showcased through the various subtle hints and bold visuals. Combining visual and interactive components made guiding the player through embedded narratives easy. However, in a full-scale game or interactive experience, the use of dialogue and writing can help facilitate more immersion than the environment can.

Throughout production, the exterior environment required a much more subtle approach than its interior counterpart. The less-is-more approach helped relay a sense of foreboding about what was to come next. Examples include broken glass on the ground and vines creeping out of the top windows. Careful consideration is necessary when dealing with exterior environments because if the cues are not displayed correctly, it can significantly affect how the game's narrative is interpreted.

Another limitation that was found was the player character interaction. In this project's initial planning, there was going to be little or no dialogue present, written or voiced. However, the visually striking environment lacked the level of immersion that needed to be captured.

Considering how intense the narrative was, it did not seem realistic for the players to react silently to the events in front of them. To placate this, the decision to add more interactive elements was needed. For example, when the player interacts with an object, it showcases the player's thoughts about said object. I think that the players' thoughts throughout the project helped engage the immersive experience better. For future environmental design projects, it is possible to create stories primarily through the environment; however, researchers should also consider the interactive aspects of game design as it can significantly enhance the overall visual experience.

Illustrations

Figure 1. High polys sculpt of blood tree in Zbrush

Figure 2. Retopologized lowpoly model done in Zbrush.

Figure 3 Skeleton in tree.


Figure 4 Cabin overtaken

Figure 5 First Tree encounter.

Figure 6 Kitchen overtaken by plants.

Figure 7 Cabin in the Daytime


Figure 8 Cabin at Night

Figure 9 Book that leads to the fairy realm.

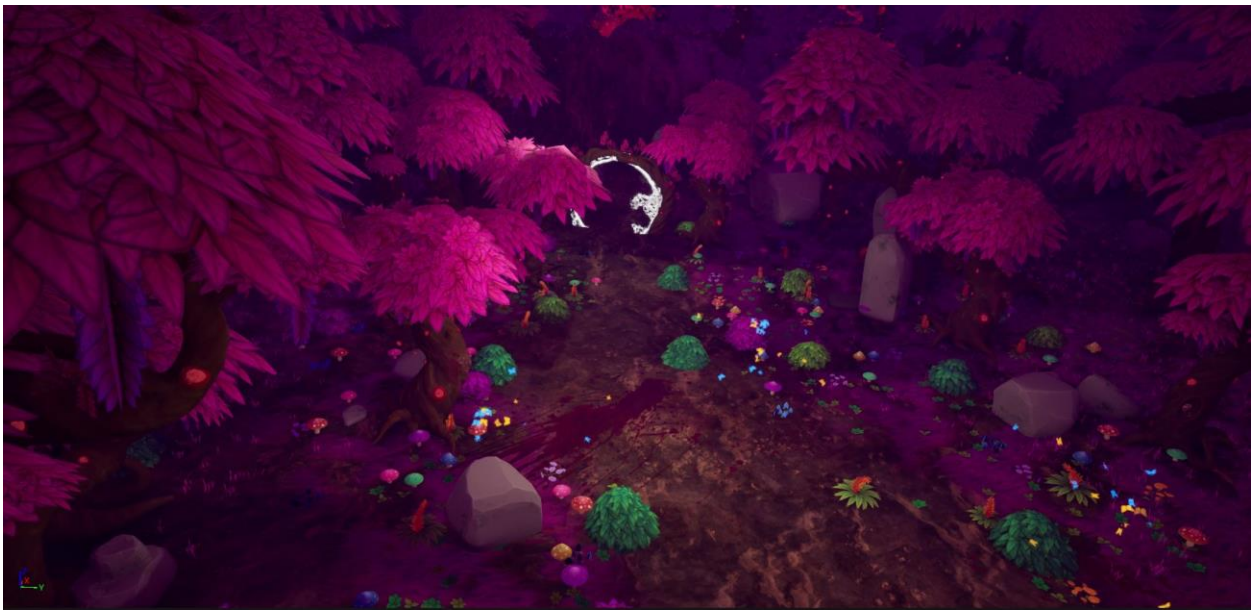

Figure 10 Fairy portal in the Fairy Realm

Figure 11 The Great Fairy Tree

References

Álvarez, R., & Duarte, F. (2017). Spatial design and placemaking: learning from video games. *Space and Culture, 21*(3), 208–232. https://doi.org/10.1177/1206331217736746

Amiri, F. (2019). Narrative in Story-Driven Video Games: A Comparative Study of Emergent, Embedded and Mixed Narrative Techniques. *ResearchGate*. https://www.researchgate.net/publication/353435134_Narrative_in_Story-Driven_Video_Games_A_Comparative_Study_of_Emergent_Embedded_and_Mixed_Narrative_Techniques

Aroni, G. (2022, August 17). Virtual bricks, real pixels: semiotics of the virtual built environment in video games - smart semiotics. *Smart Semiotics - A global virtual*

community open to everyone wherever they are. Retrieved November 2, 2023, from https://smartsemiotics.com/virtual-bricks-real-pixels-semiotics-of-the-virtual-built-environment-in-video-games/.

Atkinson, P., & Parsayi, F. (2020). Video games and aesthetic contemplation. *Games and Culture, 16*(5), 519–537. https://doi.org/10.1177/1555412020914726

Ahoy, & Brown. (2014). *Polygon Realm: A Brief History of Graphics, Part three* [Video]. YouTube. https://www.youtube.com/watch?v=qxM9pMEnJQ0

Ahoy, & Brown, S. (2014). *Pixel Pioneers: A Brief History of Graphics, Part one* [Video]. YouTube. https://www.youtube.com/watch?v=dzN2pgL0zeg

Ahoy, & Brown. (2014). *Sprite Supreme: A Brief History of Graphics, Part two* [Video]. YouTube. https://www.youtube.com/watch?v=a1yBP5t-fSA

Bevensee, S. H., Boisen, K. a. D., Olsen, M. P., Schoenau-Fog, H., & Bruni, L. E. (2012). Aporia – exploring continuation desire in a game focused on environmental storytelling. In *Springer eBooks* (pp. 42–47). https://doi.org/10.1007/978-3-642-34851-8_4

Bevensee, S. H., Boisen, K. a. D., Olsen, M. P., Schoenau-Fog, H., & Bruni, L. E. (2012). Project Aporia – An Exploration of Narrative Understanding of Environmental Storytelling in an Open World Scenario. In *Lecture Notes in Computer Science* (pp. 96–101). https://doi.org/10.1007/978-3-642-34851-8_9

Calleja, G. (2009). *Experiential narrative in game environments*. https://www.um.edu.mt/library/oar//handle/123456789/26653

Carson, D. (2000). Environmental Storytelling: Creating Immersive 3D Worlds Using Lessons Learned from the Theme Park Industry. *Game Developer*.

https://www.gamedeveloper.com/design/environmental-storytelling-creating-immersive-3d-worlds-using-lessons-learned-from-the-theme-park-industry#close-modal

De Araújo, D. P., & Hildebrand, H. R. (2019). Gameotics: A game analysis method based on semiotics. In *Lecture Notes in Computer Science* (pp. 14–22). https://doi.org/10.1007/978-3-030-23570-3_2

DiMascio, D., & Maver, T. (2014). Investigating a narrative architecture - Mackintosh's Glasgow School of Art. *Proceedings of the International Conference on Education and Research in Computer Aided Architectural Design in Europe, 1*, 653–663. https://doi.org/10.52842/conf.ecaade.2014.1.653

Dubbelman, T. (2016). Narrative game mechanics. *Interactive Storytelling*, 39–50. https://doi.org/10.1007/978-3-319-48279-8_4

Eden, M., & Eden, M. (2020, December 16). *History of 3D Games: A Long Time Ago In a 2D Space*. Melior Games. https://meliorgames.com/game-development/history-of-3d-games-a-long-time-ago-in-a-2d-space/

Fernández-Vara, C. (2011). Game spaces speak volumes: Indexical storytelling. *Digital Games Research Association Conference*. http://dspace.mit.edu/bitstream/handle/1721.1/100274/Game-Spaces-Speak-Volumes.pdf;sequence=1

GamePlan Compass. (2022, November 23). *How did developers deal with the limitations in creating graphics in early video games*. GamePlan Compass. https://compass.gameplan.games/how-did-developers-deal-with-the-limitations-in-creating-graphics-in-early-video-games/

GDC, & Bellard, M. (2022, August 2). *Environment design as Visual Storytelling: Theory and practice* [Video]. YouTube. https://www.youtube.com/watch?v=t7VkrExQwSo

GDC, & Hall, L. (2021, July 9). *Environmental narrative: telling stories in spaces without saying anything aloud* [Video]. YouTube. https://www.youtube.com/watch?v=oXZTz3oR30A

Guardiola, E., & Natkin, S. (2017). Game Design Mise-en-scène practice: intention and means in JEU SERAI. *ResearchGate*. https://www.researchgate.net/publication/321977001_Game_Design_Mise-en-scene_practice_intention_and_means_in_JEU_SERAI

Quality Arcades. (2024). *History of Nintendo Entertainment System*. https://www.qualityarcades.com/blogs/news/nintendo-entertainment-system-from-a-z

Jenkins, H. (2004). Game Design as Narrative Architecture. *Computer*. 44, 118-130

Livingstone, D., Louchart, S., & Jeffrey, S. (2016). Archaeological Storytelling in Games. *DiGRA/FDG- Proceeding of the 2016 Playing With History Workshop, 13*. http://www.digra.org/wp-content/uploads/digital-library/LIVINGSTONE-LOUCHART-JEFFREY_PWH2B_1AUG_2G12.pdf

Logas, H., & Muller, D. (2005). Mise-en-scène applied to level design: Adapting a holistic approach to level design. *ResearchGate*. https://www.researchgate.net/publication/221217431_Mise-en-scene_Applied_to_Level_Design_Adapting_a_Holistic_Approach_to_Level_Design

Melnic, Diana. (2018). Narrated Virtual Environments: Storytelling and the Construction of Video Game Spaces. Messages, Sages and Ages. 5. 20-31. *ResearchGate*.

https://www.researchgate.net/publication/327263144_Narrated_Virtual_Environments_Storytelling_and_the_Construction_of_Video_Game_Spaces

Montfort, N., & Bogost, I. (2009). Random and raster: Display Technologies and the development of videogames. IEEE Annals of the History of Computing, 31(3), 34–43. https://doi.org/10.1109/mahc.2009.50

Neiva, E., & Romanò, C. L. (2007). The semiotic immersion of video games, gaming technology and interactive strategies. *The Public Journal of Semiotics*. https://doi.org/10.37693/pjos.2007.1.8819

Pearce, C. (2005). Theory Wars: An Argument Against Arguments in the so-called Ludology/Narratology Debate. *ResearchGate*. https://www.researchgate.net/publication/221217329_Theory_Wars_An_Argument_Against_Arguments_in_the_so-called_LudologyNarratology_Debate

Pearce, C. (2007). *Space Time Play: Computer Games, Architecture and Urbanism: The Next Level: NARRATIVE ENVIRONMENTS From Disneyland to World of Warcraft*.(pp.200-205) Springer Science & Business Media.

Ryan, M. (2006). *Computer Games as Narrative: The Ludology versus Narrativism Controversy*. https://mediarep.org/items/d53ebf25-013b-465c-87e3-79ad45182f02

Salen, K., & Zimmerman, E. (2003). *Rules of Play: Game Design Fundamentals*. MIT Press. https://gamifique.files.wordpress.com/2011/11/1-rules-of-play-game-design-fundamentals.pdf

Schmidt, M. (2020, August 7). Making a modern vector graphics game. *Game Developer*. Retrieved November 30, 2023, from https://www.gamedeveloper.com/design/making-a-modern-vector-graphics-game

Sweetser, P., & Wiles, J. (2005). Scripting versus Emergence: Issues for Game Developers and Players in Game Environment Design. *International Journal of Intelligent Games & Simulation*, *4*(1), 1–9. https://eprints.qut.edu.au/46349/

The Logo Creative. (2021, December 14). The Evolution of Video Game Graphics. *Medium*. https://thelogocreative.medium.com/the-evolution-of-video-game-graphics-1263684f0e38

Wirtz, B. (2023, September 9). Evolution of video game graphics: From the 16-bit to 2023. *Video Game Design and Development*. https://www.gamedesigning.org/gaming/video-game-graphics/

Zolotov, A. (2022, June 20). *The evolution of video game graphics*. Playcent Games. https://playcentgames.com/the-evolution-of-video-game-graphics/