# Where Storytelling and Interactivity Meet: Designing Game Mechanics that Tell a Story

THESIS

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By

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## Abstract

Videogames quite commonly tell stories, and yet often the story development process is disconnected from the game development process. This thesis investigates the design processes needed when developing a videogame which tells a story primarily through gameplay while keeping reliance on non-interactive media to a minimum.

This investigation was conducted by using reflective design practices. The creative work consists of the production of a short narrative videogame, and this paper is the documentation of that creative process. This paper outlines the background research that lead to the creative work, the iterative process used in production, and a critical analysis of the project results.

Dedication

To my partner John

Acknowledgments

I would like to extend my sincere thanks to my advisor Alan Price for all the discussions about videogames and fairies, as well as his encouragement and willingness to help me take on the ambitious subject of storytelling in videogames. I would also like to thank Maria Palazzi for her unerring honesty and Dr. Katherine Borland for introducing me to the amazing world of folklore studies.

Many thanks are also owed to all of the people at ACCAD who have created a wonderful and creative culture where I could complete my work.

Last but not least I would like to thank my family and my partner, John, for all the love and support they have provided for me over the years.

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# Introduction

Storytelling is an integral part of human culture. We have told stories to one another in conversation, in song, and in poetry for as far back as our cultural memory goes. When we first created images, we often depicted narrative scenes. Theater and dance have long histories of producing narrative performances. The development of written language enabled us to begin writing our stories down, and the advent of the printing press further fueled our appetites for written stories. Film and television technology created new types of media experiences, and we immediately put them to use in storytelling. The modern ubiquity of computers has given us yet newer forms of media that we can use to engage in the practice of storytelling. Videogames are one such form of new media. Like tabletop games, videogames do not always include stories. However the majority of videogames do include some form of storytelling, which makes the study of how we use videogames to tell stories a worthwhile endeavor. In my research I am studying how videogames tell stories using the defining feature of a videogame – the game mechanics.

The primary messages of a videogame are typically communicated through the actions the player takes, and the events those actions cause. The act of playing a videogame is a type of performance. The player performs or acts out the videogame story by interacting with the videogame. This differs from film and animation, in which the audience passively observes the media. In film, the actors' performances are captured in a

fixed series of static images, whereas in a videogame the players actively perform as they engage with the videogame.

Videogame creators are faced with a challenging problem when they create videogames for the purpose of storytelling. The videogame designer creates the framework for the story, but it is the player who drives the story. Thus the storytelling is the responsibility of both the designer and the player. This does not mean that videogame designers are lacking in authorial control or that videogames as a medium are ill suited to storytelling. It does mean that the methods of storytelling used by videogames actively engage the player by using game mechanics to enable particular actions which bear narrative significance. This relationship between player and game designer is what makes videogames a truly interesting and unique medium.

In most videogames the rules are never explicitly stated to the player, but rather the rules are discovered through playing with the game mechanics. The game mechanics are the ways in which the player can change the game state, i.e. the actions the player can use in the performance of a videogame and the results of those actions (Schell 41). By taking actions and observing their effects on the game state, the player can gain an understanding of the rules. With interactive storytelling, the rules define the causality that links the story events (Crawford). By interpreting the causality set up by the rules, the player can construct the videogame story within his or her own mind. In this way, the rules of a game can be thought of as the script for the game (Lancaster & Mikotowicz 4). This process is further supported by contextual information provided to the player via cut-scenes which are short non-interactive animations embedded within gameplay,

narration which uses voice over to explain story events, and visual theming which consists of the look of the game elements, e.g. the visual design of the characters and game spaces.

The research problems I will be investigating are as follows:

*What design considerations must be used in order to explore the relationship between game mechanics and narrative?*

*How can the design of game mechanics focus on the conveyance of narrative so that the videogame's storytelling can rely less on other forms of non-interactive contextual information?*

In order to conduct this research, I will create a mechanics driven narrative videogame with a minimum of other storytelling contextual information. The process I will use involves iterating between the development of game mechanics and the story. By reflecting on how this iterative process affects both the design of the game and the development of the story, I will be able to explore how game mechanics can be used in storytelling.

I am bringing to this project my own experiences as a videogame player. In order to build meaningful game mechanics, I will need to draw on my understanding of how I have found meaning in other videogames I have played. I am also bringing to this project the technical skills that I have developed over the course of several previous attempts at creating narrative videogames.

In order to discover answers to my research questions, my project will need to use game mechanics that are integral to and representative of the story. Videogames can be considered to have two layers: an abstract layer – which I will refer to as the gameplay and an optional narrative layer – which I will refer to as the fiction (Ang 306). These layers are similar to how a painting has an abstract composition, and may or may not also contain a narrative depiction. Within this paper I am using the term fiction in a way that is specific to game design. The fiction can be thought of as the fictional game world (Juul "Half-Real: A Dictionary of Video Game Theory"), however it is more than just the environmental design. The fiction is made up of the visual theming, and any stories that flesh out the game world[1].

The established approach to game design is to begin with the game mechanics and develop the story later on (Hunicke et al. 2). The mechanics-first design methodology ensures that the mechanics are solid enough to hold player interest and be the main core of the videogame. Because the primary messages within a videogame typically come from the gameplay and not the fiction, it is often important to ensure the gameplay is as strong as it can be before spending time developing the fiction. In part because the development of the fiction is sometimes separated from the development of the gameplay ludonarrative dissonance, a conflict in messaging between the gameplay and fiction, can result. This is discussed in greater depth in the background section of this paper. In an

[1] Certain kinds of tabletop games have very elaborate fictions that contain stories. However the games themselves are not particularly geared towards story telling. For example the *Warhammer* universe has incredibly detailed back-stories for each of the races and hero characters; however one could easily play *Warhammer* without ever engaging with the fiction. It is worth noting that tabletop gamers have their own word for the fiction that has never really made the jump to videogames. In the tabletop gaming world, the fiction is known as the fluff.

attempt to avoid any such conflicts in messaging, I will be developing the story and game mechanics simultaneously.

In creating my project I will need to develop a better understanding of good game design practices through secondary research with established texts on game design. Many considerations will need to be taken into account as a part of my design process. These considerations include balancing between ease and difficulty of the videogame, creating level layouts that guide the player, and learning the technical skills needed to make the game run efficiently.

As part of my study of game mechanics in narrative videogames, I will need to gather more knowledge about story structures, and how players "read" or interpret meaning from videogames. Videogames are not strictly structured in terms of narrative; they also have game structures such as 'move forward to achieve goals' or 'collect points'. Certain story structures may work better with the game structures than others. The development of game mechanics may disrupt or alter the usual plot structure in a particular story, creating story structures that are less reliant on plot progression and more focused on systems and relationships.

### *Overview of the Paper*

This paper consists of five chapters. The first chapter covers the background research completed before the production of the creative work. This background research includes an overview of relevant game design theories and practices, as well as critical examination of other game designers' work. The following section, chapter 2: Concept

Development looks at the particular story I worked with in my creative research and discusses how other game designers have told similar stories.

The third chapter, Creative Process, explains the processes used in creating the research project. This section is divided into five sub-sections. These subsections include *Development of a relationship-based story* which covers how game mechanic driven stories should be thought of in terms of relationships between characters and environments rather than plot, *Resolving failed story relationships* which explains how I fixed story relationships that were not working well, *Initial design approaches* which explores my first attempts at creating *Tiny Maia, Consequences of a small scope* which covers the aspects of *Tiny Maia* that could have been improved had more resources been available for the project, and *Creating an ending* which covers the last steps of story and game development used in *Tiny Maia*.

The fourth chapter contains two synopses of *Tiny Maia*. The first synopsis is a one-paragraph introduction to the creative work meant to accompany it in writing, and the second is written as a five-minute presentation about the creative work. The fifth and final chapter reflects on the lessons learned from conducting this research.

## Chapter 1: Background for the Research Project

The purpose of this paper is to explore the process of developing game mechanics that not only work in harmony with narrative but also that becomes a part of what conveys the narrative. This exploration requires us to consider how game mechanics and story relate to one another. Chee Siang Ang discusses the interplay between storytelling and ludic videogame elements in the paper *Rules, gameplay and narratives in videogames*. Ang identifies two layers in videogames; the abstract layer or gameplay, and the narrative layer or fiction (306). The gameplay is the heart of a videogame, and is defined by the game mechanics. The fiction is the layer in which the story is explained for the player. This layer acts to contextualize the gameplay. Although the game designer may choose to not provide a fiction, the designer cannot prevent the player from constructing their own fiction and imposing it on the gameplay (Murray qtd. in Ang 314).

To demonstrate the distinctions between gameplay and fiction I will discuss *Bejeweled* and *Puzzle Quest*. Both *Bejeweled* and *Puzzle Quest* use the same core game mechanics, but one has little fiction and other has a complex fiction. In both videogames, the player is presented with a grid of objects which can be swapped in order to create lines of three or more identical objects. Once three or more objects are matched, the matching objects disappear and are replaced by randomized objects. *Bejeweled* is a non-narrative puzzle game and as such does not present the player with any fiction beyond its visual theme of precious jewels. *Puzzle Quest* however, adds a more complex fiction to

*Bejeweled* style gameplay. Puzzle Quest tells a fairly generic story about adventurers on a quest. The matching object gameplay is given a narrative meaning in the sense that making a match is explained as causing an action to be taken. For example, matching three skulls means the player performs an attack and matching three coins results in the player collecting coins. While in *Bejeweled* matching objects only awards the player with arbitrary points, in *Puzzle Quest* matching objects means the player takes one of several actions.

Ideally the gameplay and fiction should support one another in a videogame. However often they are disconnected or even in conflict. For example, a game designer could intend the story to be about forming a friendship, but use conflicting mechanics that are actually about collection of goods or combat with enemies. In this case, the messages in the story would promote empathy and caring, but the gameplay would promote selfish hoarding and dehumanizing others. This conflict between gameplay and fiction has been called ludonarrative dissonance. Despite the difficulties of creating a narrative videogame, illustrated by the many instances in which ludonarrative dissonance is found in games, most videogames do contain some sort of fiction and great strides have been made in storytelling in videogames. Despite these advances ludonarrative dissonance remains a persistent problem.

The term ludonarrative dissonance was coined by Clint Hocking in a blog post critiquing *Bioshock*. The story within *Bioshock* is meant to explore the consequences of and to offer a refutation of Ayn Rand's objectivist philosophy. Within the gameplay of

*Bioshock*, the player is asked to choose between selfish and altruistic actions—specifically the player can either save or harvest the Little Sisters the player meets throughout the game. However, within *Bioshock*'s fiction the player character is aligned with a non-player character (NPC) who represents the rejection of Objectivism. As a result a player who chooses to embrace Objectivist ideals and behave selfishly is forced to act out of character during some sequences and the meaning of the videogame becomes muddled.

As with any design inconsistency, ludonarrative dissonance is something designers generally strive to avoid. In my experience, players will happily ignore the story if it is bad or inconsistent so long as the gameplay is engaging. Thus, from a player perspective, if there is a conflict between fiction and gameplay, the gameplay will take precedence. Designers should keep this in mind when developing stories to fit gameplay, especially if they want players to engage with the story as well as the gameplay.

When videogames and fiction work together, quite often it is not that the game mechanics support the story but rather the reverse. In *Portal* the player is asked to complete a series of contrived physics puzzles. The gameplay could be presented in a completely neutral abstract space with no explanation; however that would run the risk of making the videogame unbelievable and inexplicable. The story of Chell trapped by a passive-aggressive artificial intelligence intent on performing endless dangerous tests using the portal device, explains the contrived nature of the space and helps to motivate the player to complete the playthrough.

In *MDA: A Formal Approach to Game Design and Game Research* the authors posit that designers approach videogames from the mechanics through the dynamics (i.e. gameplay) towards the aesthetics (i.e. fiction and visual theming) (Hunicke et al. 2). Since the overall development process typically begins with the development of mechanics, the story development process needs to start with thematic elements which complement the mechanics. In order to do this, *Defender's Quest* creators James Cavin and Lars Doucet began story development by creating a story that explains game mechanics (Doucet). The game mechanics became the framework upon which the story was built (Doucet).

As another example of using game mechanics as a starting point for narrative, I will discuss *The Swapper*. When narrative designer Tom Jubert was brought in to write the story, *The Swapper* already had a developed central game mechanic and a loose plot outline ("Designing Narrative to Fit the Gameplay"). In order to prevent any disconnects between the gameplay and fiction, Jubert looked to the gameplay to find the controlling idea for the narrative ("Designing Narrative to Fit the Gameplay").

Figure 1. Screen capture from *The Swapper* by Olli Harjola, Otto Hantula, Tom Jubert, and Carlo Castellano (2013)

The central mechanic for *The Swapper* is creating duplicates of the player character and moving consciousness between them. In order to progress, the player must collect certain items, and clones without the consciousness cannot pick up items. Solving the puzzles to get the items involves creating, swapping into, and destroying multiple clones. The screen capture above shows how the player can "climb" to new areas by creating clones in the air and swapping with them. The new clone will safely land on the platform, but the currently ensouled clone will fall to its death. The fiction focuses on the nature of consciousness and the relationship between the mind and the body. The resulting story is about identity, the mind-body problem, and the boundaries that separate one individual from another. Because the player in the role of the main character is

constantly creating and destroying duplicates of herself, the player has to question whether or not the main character is her body (and if so, which body) or her mind which can be disconnected from her body by using the swapper device. By deriving the story's controlling idea from the mechanics, Jubert ensured that the narrative and gameplay were inextricably linked.

This process of deriving story from largely abstract rule systems is a creative process unique to videogame development. Because this process is unique, this is one of the reasons videogame designers can create new and interesting stories and methods of storytelling. The videogames that come out of this process are often at their best when both the fiction and the gameplay are equally strong. It is important to remember that storytelling in videogames is not something that can occur only in the fiction, but rather storytelling can be found at the confluence of the fiction and the gameplay.

There are some draw-backs to the process of developing stories based on well-developed game systems; the emotional range of videogame stories may be stunted by the game structure. Richard Lemarchand identified this problem when he observed that the emotions we associate with videogames are limited to those that we associate with competition, e.g. triumph, excitement, and frustration ("Beauty and Risk"). A large factor in this limitation is the notion that a videogame must end with either a win or a loss. Because we have collectively assigned emotional expectations to the meaning of a game's ending, we have severely and artificially restricted what sorts of stories can be

told through videogames. If videogames are going to live up to their potential as a storytelling medium, they will need to be able to evoke a wider range of emotions.

Game developers have been pushing the boundaries of the emotions evoked by videogames and broadening the range of stories told within videogames. Games like *Gone Home* and *Mainichi* explore stories about people living their day-to-day lives and all of the little joys and sadness's that involves. Unfortunately, a common response to videogames which alter the emotional impact of game mechanics is often to claim those videogames are not games[2]. When familiar gameplay is accompanied with an unexpected fiction, for some reason the gameplay becomes more difficult to recognize. Game designers and players may talk about game mechanics as being meaningfully separate from fiction, but we also often conflate common mechanics with their usual fictions, such as referring to a fail state as death.

Further consideration can be given to the idea that videogames must have win and fail conditions. Games such as chess or poker are literally competitions, and it makes sense that these games must end with determining winners and losers. In cooperative and single player story focused games, it is not so easy to define wins and losses. For an example from tabletop games, if a player character dies in a *Dungeons and Dragons* campaign, that player isn't generally considered to have lost the game[3]. Player character death is simply one possible event in the string of events that make up the campaign (which may or may not have defined end goals). If the player wishes to continue playing,

[2] One of the creators of *Gone Home*, Steve Gaynor, presented a talk titled "Why Is *Gone Home* a Game" as a response to the people who questioned what *Gone Home* was.

[3] The basic rules for *Dungeons and Dragons* defines the win conditions thusly: "The group might fail to complete an adventure successfully, but if everyone had a good time and created a memorable story, they all win" (Mearls and Crawford 2)

she can either persuade the other party members to revive her character, or she may roll a new character.

In narrative single-player videogames, the game structure often presents the end goal of a game as a victory; however the fiction can change the emotional impact of the ending which can make the ending feel much less like victory. In *Journey*, *Sword & Sworcery,* and *Dear Esther*, the player reaching the end goal results in the player character's death. Mechanically these endings work in the same way as a more conventional victory. It is the interplay between the 'win' mechanic and the fiction that creates the emotional depth and variety between *Journey*'s bittersweet acceptance, *Sword & Sworcery*'s courageous sacrifice, and *Dear Esther*'s bitter sorrow.

Just as the fiction can alter the meaning of a win state, fail states can also be impacted by the fiction. Fail states in narrative videogames are not the same thing as losing a competitive game. In the majority of single-player and cooperative multiplayer narrative videogames, only the win state ends the game; the fail state only results in temporarily removing the player from the game, and perhaps some loss of progress or other punishment. These fail states are usually defined in the fiction as player deaths, which are inexplicably reversed when the player re-enters the game world. The fiction can be used to explain the player's revivals, such as in *Dark Souls* where the player character is a cursed undead creature known as a hollow. The curse prevents the player character from being permanently dead.

Beyond simply providing an explanation for the fail state, the fiction can use the fail state in its storytelling and character development. In the 2008 *Prince of Persia*, the fail state is depicted as a near-death from which the prince is saved by his companion, Elika. In the story, the prince is assisting Elika, and in turn Elika saves the prince when he is about to die. This helps to depict the growing mutual respect and dependency between the prince and Elika. This re-imagining of a fail state also served to change the emotional effect of failure. Although this fail state is mechanically identical to other fail states, a common complaint about *Prince of Persia* was that it was too easy because the player character could not die. It is likely that players were expecting to feel frustrated, and were disappointed when they did not. Although this was an unpopular design choice, it does demonstrate how fiction can work with game mechanics to create new emotional experiences within videogames.

When studying game design, it is useful to think of the fiction and gameplay as separate layers, and it is important to look at how those two layers relate to each other. The MDA framework states that players move from the fictions towards the mechanics, which is the opposite approach of the designers, meaning that the fiction is a kind of hook that draws the player in while the gameplay is ultimately what the player cares about (Hunicke et al. 2). This does not have to mean that the fiction is a superficial outer layer. If game designers consider story and gameplay to be equally important and give their attention to how the fiction relates to the gameplay, a world of possibilities opens.

## Chapter 2: Concept Development for the Creative Project

In order to address my research questions, I have developed a story focused videogame titled *Tiny Maia*. As discussed in the previous section videogame development typically starts with the mechanics and works towards a story later based on those mechanics, I have opted in this case to attempt simultaneous development of the game mechanics and the story. The resultant push and pull between game development goals and story development goals will help to uncover the relationships between gameplay and storytelling in games.

My initial concept for my thesis project was to create a videogame inspired by a fairy tale. One reason for choosing fairy tales as inspiration for my story, is that fairy tales have game-like qualities. In the introduction to Maria Tatar's edition of the Grimm's collected stories, A. S. Byatt compares the structures of fairy tales to that of board and card games (20). Byatt notes that within fairy tales certain rule systems are unerringly followed, and this gives reading fairy tales a feeling similar to exploring the rule systems in chutes and ladders (20). These rule systems within fairy tales are often the source of the fairy tales' moral messaging. For example, go straight to grandmother's house, do not stop and talk to the wolf along the way, or he will eat you. Likewise, the primary moral messaging within videogames tend to be found within their rule systems, a phenomenon Ian Bogost has named procedural rhetoric ("Persuasive Games" 28). In folklore, the study of tales is complicated by the fact that each tale exists in many variations (Propp 5). In

Morphology of the Folktale, Vladimir Propp outlines how we can study tales by viewing fairy tales as stories made up of formulaic components arranged in particular relationships (21). Just as fairy tales can be studied by analyzing the relationships between the tale's component parts, we can analyze videogames based on the relationships between their components.

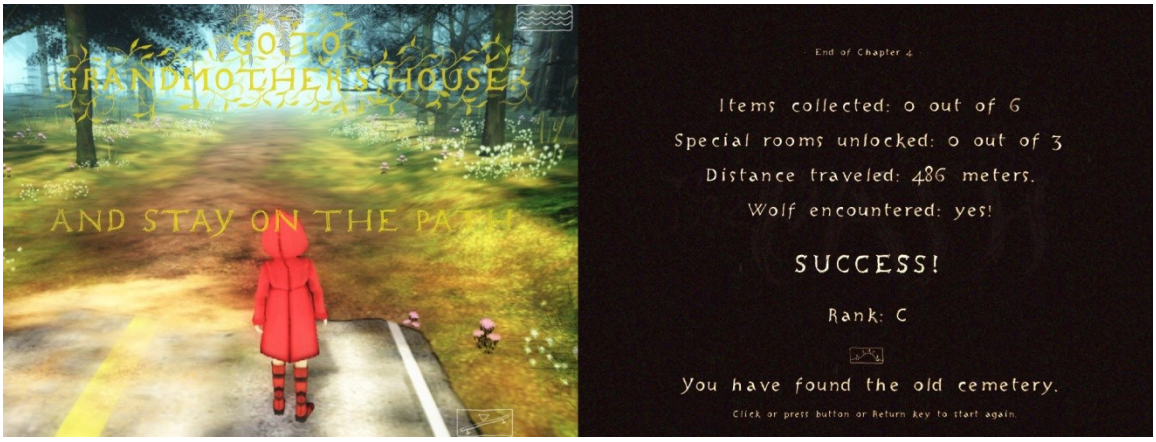


Figure 2. Screen captures from *The Path* by Tale of Tales (2009)

In order to understand the challenges involved I looked to the work of others to learn how they solved similar design problems. One of the first videogames I looked to was Tale of Tales' *The Path*. Tale of Tales is known for their fairy tale inspired videogames. *The Path* is based loosely on Little Red Riding Hood. The player chooses to play as one of six sisters and then is taken to a path and given the instructions to stick to the path and go to grandmother's house. If the player follows those instructions, she will see a game over screen, and the game will give her a failing grade on her completion of the level. The real goal of the game is not to get to grandmother's house intact, but to

explore the woods and encounter a wolf. Each of the sisters encounters a different wolf, and each of the wolves represents different dangers faced by women and girls. The story of *The Path* is recognizable as Little Red Riding Hood, however the procedural rhetoric of *The Path* changes the moral messaging. While the moral of Little Red Riding Hood may be move quickly to your destination and do not stop to talk to the wolves along the way, *The Path* says it is important to stray from the path and face the dangers. The wolves will almost certainly hurt, but it is better to experience the painful world than not.

*The Path* makes use of procedural rhetoric again to communicate to the player the importance of taking time to explore. The girls in *The Path* can run as well as walk, however as they run the screen slowly darkens around the edges making visibility increasingly low. Additionally the flowers that need to be collected in order to achieve a better grade on the level are not visible at all when running. If the player wants to do well in the game, the mechanics of the game make it clear that she will need to take her time and slowly wander through the seemingly endless forest.

When fairy tales are re-told, quite often they are altered so that the moral messages suit the moral stance of the teller (Ben-Amos 107-117). *The Path*'s retelling of Little Red Riding Hood participates in this tradition of altered re-telling. In addition to learning from Tale of Tales' use of procedural rhetoric, their work also demonstrates the importance of retelling a story in a way that emphasizes the views of the storyteller, rather than slavishly replicating the views of the previous telling.

It is also important to note that *The Path* does not directly replicate all of the plot points of Little Red Riding Hood. Instead it makes broad references to and borrows

structures from the source story. In developing *Tiny Maia* it has been important to look at the inspiration story from a structural standpoint rather than focusing on plot and specific events. When working with a source story, it can be tempting to recreate every event, but often that does not work with the new form. Rather than focus on events, I found it was better to focus on character and setting.

Figure 3. Screen capture from *Spate* by Eric Provan – Ayyo Games (2014)

Another videogame I have looked to for inspiration is *Spate* by Eric Provan. The story in *Spate* is about as different from *Tiny Maia* as one could get, however the way the story is presented is very similar to how *Tiny Maia* presents the story. *Spate* is a steam-punk noir style videogame that follows the story of a grieving alcoholic father named detective Bluth. Like *Tiny Maia*, *Spate* is a 2.5D platformer, meaning the environment

and characters are modeled in 3D, but the movement occurs only along a 2D plane and some 2D elements are used along with the 3D elements.

The mechanics in *Spate* are largely the standard 2D platformer run and jump mechanics; however there is one unusual mechanic. Because Bluth is an alcoholic, he can take a drink of absinthe at any time. Drinking causes the image on screen to distort, and Bluth to gain the ability to jump significantly higher (as show in Figure 3). The effects only last a few moments, but the player can prompt Bluth to drink again in order to prolong his inebriation. The distorted imagery makes it significantly harder to make the needed jumps, however the increased height makes the jumps easier and in some cases possible. Several areas in the Spate can only be reached while Bluth is drunk. The effects of the absinthe model the relationship Bluth has with the drink: absinthe makes his life easier in some ways and harder in others. This demonstrates how game mechanics can express a player character's relationship to the world. In *Tiny Maia*, I have attempted a similar use of mechanics to model Maia's relationship with sunlight; the resultant mechanic forms the core of *Tiny Maia*'s gameplay.

Another unusual aspect of *Spate* is the use of long sections without any obstacles for the player to overcome. For those sections, Provan was inspired by the use of long duration shots in film ("Indie Interviews"). Provan notes that film shots average at about 3 seconds, and as a result shots with longer durations occupy our minds and have a very different emotional impact – long slow shots put us in a deep contemplative and observant mind-set while fast cuts are more exciting and overwhelming ("Indie Interviews"). The use of long sections where the player simply walks through a space is a

bold move on Provan's part given that this style of level design goes against the conventional wisdom to always give the player something to do. Provan's use of atmosphere and even the drinking mechanic keep the long obstacle-free segments from becoming boring. The effect is indeed very like a long slow shot in a contemplative film.

While reading through a book of Hans Christian Andersen's work, I came across *Thumbelina*. After reading it for the first time in many years, I knew this story would be the inspiration for my thesis project. It contained the basic structure I was looking for – a journey into an unknown place. In addition, *Thumbelina* has an interesting take on this familiar structure. Instead of following an ordinary person venturing into lands inhabited by supernatural creatures, we follow a supernatural creature journeying from an ordinary house to her far away wilderness home.

One of the aspects of *Thumbelina* which most appealed to me is the way in which Thumbelina's identity is shaped by her surroundings. Her journey to the sunny meadow is not only about finding her home; it is about finding the conditions that allow her to be her best and truest self. In Andersen's story, Thumbelina is given wings and a new name when she reaches her people's home (Andersen 30). This shows that she is now her true self and is no-longer defined in opposition to other people and creatures. In my videogame the main character, Maia, will always be herself, however how she manifests will change based on her context. The primary shift in Maia's form will be that when she is in shadow, she will be humanoid. When she is in a sunbeam, she will gain wings and therefore the ability to fly. This shape-shifting both reflects the story focus on contextual

identity, and shapes the gameplay. Because my process focused on the use of game mechanics, the development of the flying mechanic changed the story I was working with, and altered the sequence of events. This is discussed in greater depth in the *Development of a relationship-based story* section of Chapter 3.

To explore the world and reach new areas Maia can either fly or jump depending on what environment is available. Certain areas may only be accessible if Maia uses the momentum from flight in order to "slingshot" over a patch of shadow. Navigating the game world requires the player to gain an understanding of how Maia is affected by her surroundings. In this way the story is about Maia finding her way in the world and understanding herself, while the game is about the player learning those same lessons about Maia and her world. The player failing to make jumps while learning the rules becomes a part of the story of Maia stumbling and learning. The gameplay will consist of platforming that explores these shifts in physical form.

# Chapter 3: Creative Process

Because I am studying how the design of game mechanics supports storytelling within videogames, it was important to keep the fiction and gameplay relatively equal in importance. In order to prevent one or the other from becoming underdeveloped or out of balance, I chose to use a process in which development of the story and gameplay occurred simultaneously. As discussed earlier in the background section, the MDA framework posits that game designers begin with the mechanics and dynamics (which make up the gameplay), and work towards the aesthetics or fiction. However game design is an iterative process, and therefore the journey through the MDA framework is not a swift and direct one; it is often necessary to backtrack and further develop mechanics after the aesthetics have begun development. Although this pull between developing the story and the gameplay is not completely unique to my process, I was purposefully attempting to push this iterative design process in an attempt to learn what parts of the story were being conveyed by the game mechanics.

## *Development of a relationship-based story*

When developing the mechanics beyond the basic genre form, I often started by considering the story I wanted to tell. However this was only useful once I began to think of story elements in terms of relationships rather than plot points. This of course required me to change the way I thought about story. When I was first thinking about story, I was

thinking primarily about the story's plot or sequence of events. Plot is only one aspect of story and it is an aspect that is not particularly important for videogames ("Narrative on a Budget"). Clara Fernandez-Vara and Matthew Weise provide an interesting and helpful definition for story in their IndieCade talk: story is character and setting combining to form drama ("Narrative on a Budget").

The first character and setting relationship I focused on was Maia's relationship with sunlight. Thumbelina's affinity for sunlight inspired the core mechanic in *Tiny Maia*—the main character's shape-shifting between humanoid form and winged form as she enters and exits direct sunlight. Thumbelina gains the ability to fly at the very end of her story. In my story, Maia gains the ability to fly every time that she is enters a sunbeam, which happens within the first level before Maia even leaves the house. Bringing the wings into the story earlier breaks that sequence of events, however the wings evoke feelings of joy and freedom that I wanted the player to connect with the sunlight, thus contributing to the story I am telling.

Before I had built character models, Maia's shape-shifts were represented only with color changes. This did not provide any clue to the player that Maia's abilities had changed; therefore the player had no reason to try to move in new ways. Once I had implemented Maia's character models, her appearing and disappearing wings acted as a clear signal to the player that Maia's movement rules were changing.

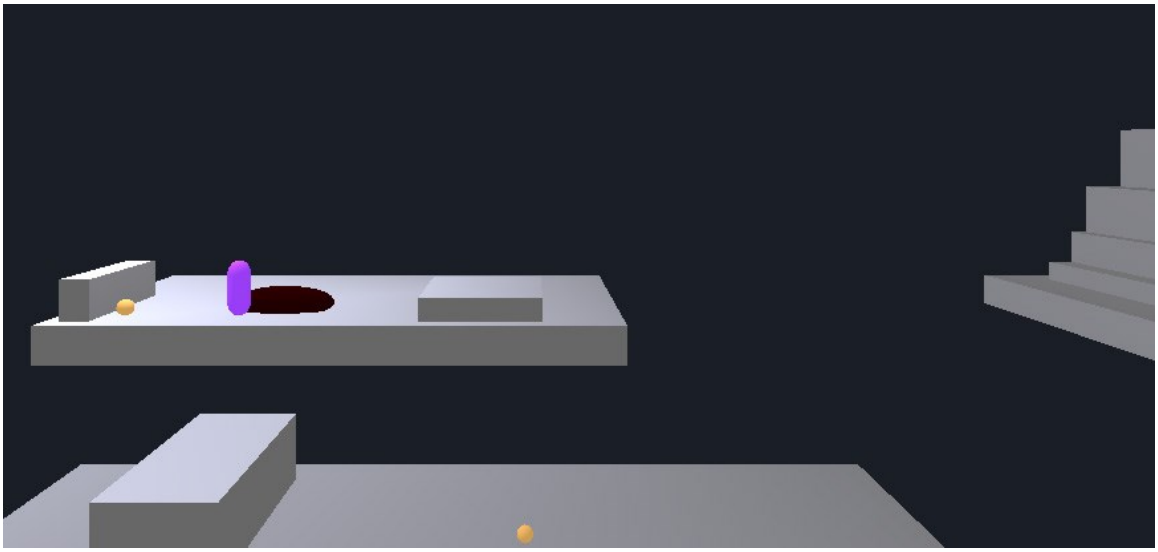

Figure 4. Screen capture of an early *Tiny Maia* prototype with only abstract graphics

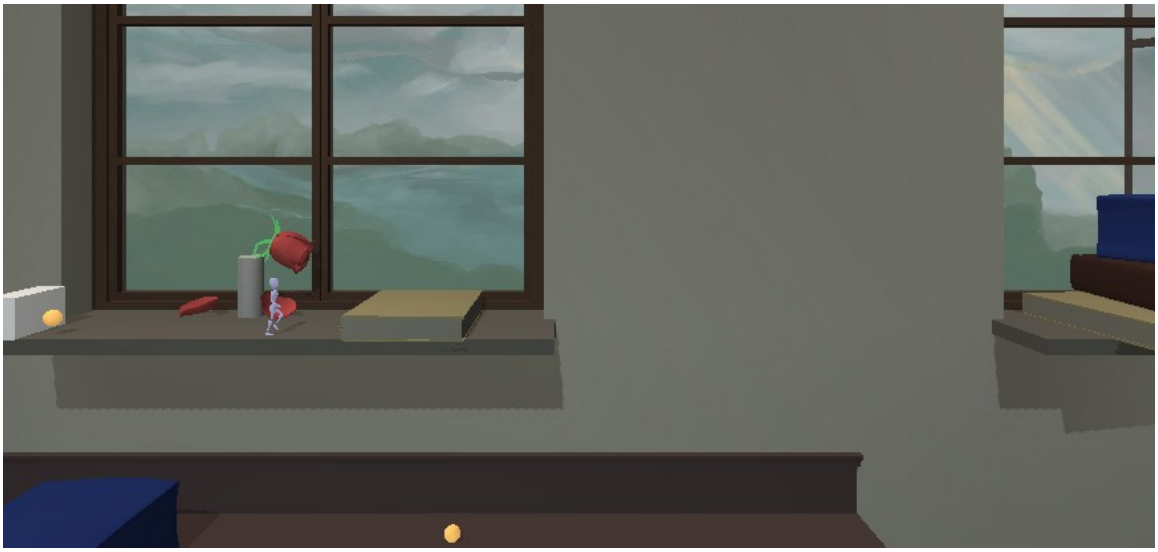

Figure 5. Screen capture of *Tiny Maia* mid-way through production


Figure 6. Screen capture of *Tiny Maia's* finished representational graphics

*Resolving failed story relationships*

After successfully modeling Maia's relationship with sunlight, I next tried to model Maia's relationship with mayflies and flowers through game mechanics. This attempt failed at first, but the process eventually lead to a new development for Maia's character.

At the start of *Tiny Maia*, the titular character is born out of a flower. In order to firmly establish Maia's relationship to flowers, I decided she should collect pollen from flowers and that the pollen would strengthen her legs making her able to jump higher. Since I had already decided she would be a shape-shifter, I wanted to show her increase in strength by changing her form as she gains strength. In Andersen's *Thumbelina*, a mayfly abducts Thumbelina because she is pretty, but the other mayflies deem her to be ugly and too human-like. After a time, the captor mayfly agrees with the others and

rejects Thumbelina. To illustrate that change in the way the mayflies perceive her, I set up a system where contact with the flowers (collecting the pollen) would cause Maia to become more insect-like, and contact with mayflies would cause her to become more humanoid. Her ability to jump would be connected with her appearance at the time, i.e. when she is humanoid she has a short jump and when she's insect-like she has a high jump. I never managed to fully implement this system, and the parts that were implemented did not work especially well. The conceptual reasons for Maia's shifting between humanoid and insect-like shapes were unclear, and the connection between her appearance and jumping ability was easy to miss. This system was over complicated and connecting too many relationships at once. The result was muddled meaning, as evidenced by player confusion.

To solve this confusion, I cut down the system to the most important relationship—that between Maia and the flowers. With the mayflies out of the equation, it no-longer made sense to have Maia evolve into a bug-like form. Instead she simply gains the higher jump without a change in appearance. Even without a visual indicator, Maia's ability to jump higher still communicates the purpose of the pollen to the player.

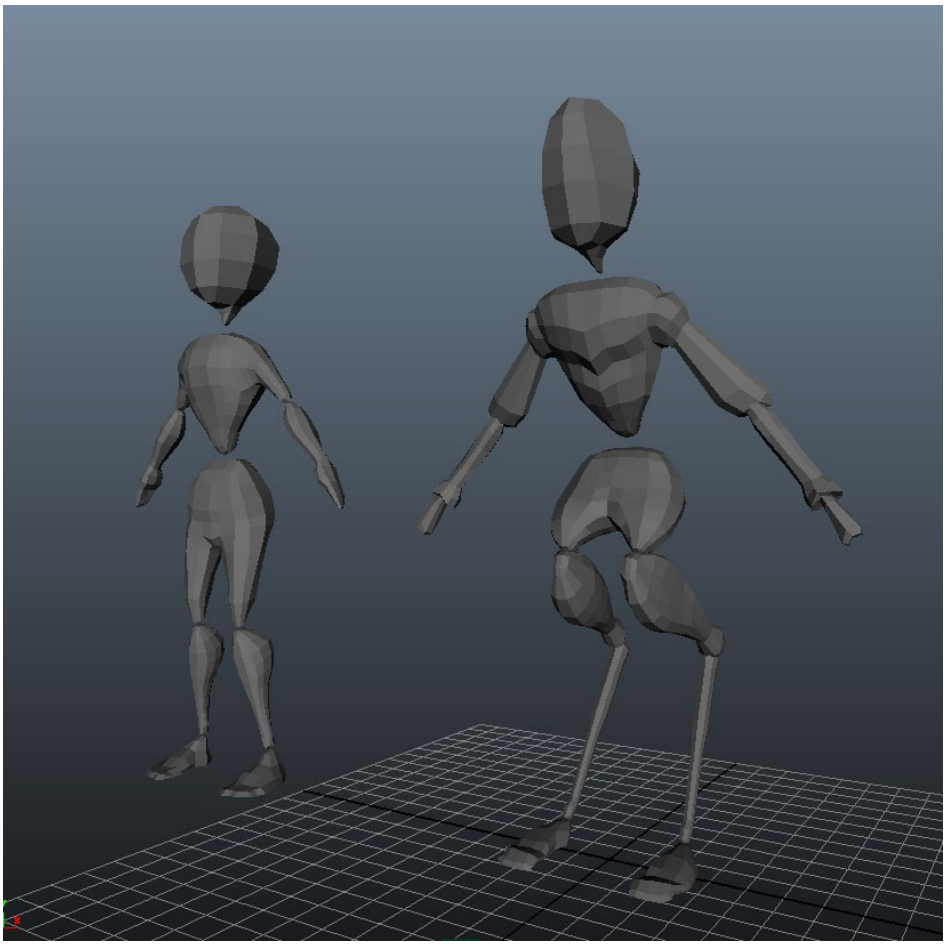

Figure 7. Early models of Maia's humanoid and bug-like forms

At this point I needed to figure out why Maia was getting stronger when she collects the pollen. I realized that when Maia is born out of the flower, like all newborns she is not fully-formed. The pollen is a nutrient which allows her to grow and gain ability

The initial design of *Tiny Maia* was hindering the communication of this relationship between pollen and growth to the player. I used the design of the first level to teach the player what the pollen does for Maia as she collects it. When Maia first appears, a series of obstacles to the right are impossible to clear until Maia has picked up some

pollen. However, it is entirely possible that a player may pick up the pollen on the left before trying the path to right, which would cause that player to miss the lesson about the pollen. In order to ensure that players learn about the pollen, the end section of the first level has a similar obstacle set up.

To further emphasize the pollen's effects, the first two times the player picks up pollen Maia kicks and pumps her legs. This is designed to reinforce the connection between the pollen and Maia's legs, and prompt the player to observe the way in which the pollen has effected Maia's jumping. Changing the jumping animation as Maia "grows" could potentially have provided yet greater reinforcement.

### *Initial design approaches*

Before I began thinking of story with a focus on the relationships rather than on plot, my initial prototypes and concepts attempted to directly recreate plot points and settings from *Thumbelina*. It quickly became apparent that focusing on recreating those moments was not generating interesting and cohesive gameplay. For example, Thumbelina's escape from the frog was initially recreated by allowing the player to tether to a lily pad and fly forward giving it forward momentum that would carry Maia farther than she could fly on her own. Although this is similar to how Thumbelina escapes the frogs in the written story, this gameplay proved to be frustrating and out of place. The mechanic was limited to one small section of the videogame which was very different from the rest of the videogame. Because the moment only happened once, players were not able to learn how to do it, and as a result the moment became about struggle rather

than flight. One possible solution would have been to include more of this type of lily pad towing, however that would not have fit well with the story. Rather than recreate the escape event as described in *Thumbelina*, it was more important to establish the relationship between Maia and the frog.

Although that particular mechanic needed to be removed, the frog that motivated it remains in *Tiny Maia*. In *Thumbelina*, the frog motivates the entire journey by abducting Thumbelina from her home. Because I wanted Maia to be a more active character, I altered that part of the story to allow Maia to exit the house riding a wind gust on a rose petal. I still wanted to keep the frog character as a sort of captor in the second level. In my version, the frog catches Maia and carries her across part of the pond to a lily pad. In the first prototypes, the frog would chase Maia through roughly half of the level trying to catch her. If the frog catches Maia again, she will be taken back to the lily pad near the start of the level. This chasing and catching mechanic was buggy and felt out of place.

At a certain point in development, I had to remove the catching mechanic if only due to time and resource constraints. I left in the code which made the frog follow Maia, but the frog is no-longer a threat to Maia. I was surprised to find that the change in frog behavior caused this section of the game to flow and fit better with the rest of the game. The antagonistic frog became a peaceful and helpful companion, which resonates more with the general theme and mood of the rest of the videogame and the story that was developing.

Figure 8. Screen capture of the frog sitting on the bank

The moment when the frog first catches Maia before helping her across the pond, does still stick out somewhat from the rest of the experience. The way it is animated gives the appearance that the frog has eaten Maia. This moment is also early enough in the game that players are still learning the rules of the game world. It is easy for players to mistakenly believe that the frog is the new player character. When I first realized this, I considered changing the animation. However I felt that the moment created an interesting contrast with the rest of the game and provided a needed moment of surprise. Instead of trying to minimize the strangeness of the moment, I decided to extend that moment. In the final version, the frog waits on the shore until the player presses a button. Only once the player is ready to move, does the frog carry Maia to the lily pad and release her.

### *Consequences of a small scope*

The reality of creating any project is that the designer will often wish the scope could be larger than it is. As the designer works, it is sometimes revealed that the resources that would be needed in order to complete the project were underestimated. If the designer can't devote more time or other resources, the only option is to make design decisions that control the scope of the project so that the work can be completed. In this section I will discuss these decisions and how I would have designed *Tiny Maia* if I had more resources to devote to it.

Part of how I controlled the scope of *Tiny Maia* was by choosing to use techniques that I had previously implemented successfully in other videogames. For example, the modified character controller was similar to one I had used in a previous videogame. Because I was not spending time creating a new character controller, I then could work on improving the existing character controller—the most significant improvement being the creation of more sophisticated camera movement. This small improvement contributed to *Tiny Maia*'s cohesiveness and made it a more complete videogame.

One way in which controlling the scope hurt *Tiny Maia* was the fact that I was unable to include all the animal companions I had planned. The initial design plans included a mouse in the first level, and a bird in the third level. Due to time constraints, the entire third level, the bird, and the mouse were cut from the game. The mouse hole where the mouse would have been found is still visible in the first level. The concept I had was for the mouse to emerge from the wall if Maia sat down near the mouse hole.

This would reward the player for exploring an area that was not required for finishing the game, and reinforce the importance of the sitting mechanic. The bird in the third level was meant to fulfill a role similar to the frog's eventual role. Maia would be unable to reach certain areas without the bird's help and the bird would accompany her for part of her journey. These animal companions would have more fully fleshed out the game world and given players more information regarding Maia's role in the world.

Another way in which a larger scope would have improved *Tiny Maia* would have been more and better visuals. Conceptually Maia matures as she collects pollen; however there is little visual indication of her growth. I would have liked to show Maia changing from a child-like appearance to a more adult appearance as she gains abilities. There is also little to distinguish Maia from the prince she encounters towards the end of the videogame. Ideally the prince would have a unique character model with more masculine traits. Because that would greatly increase the amount of labor involved and time was running low, the prince is currently a duplicate of Maia. This does make it clear that the most important aspect of his character is that he is the same kind of being as Maia.

### *Creating an ending*

When it became clear that three levels would not be feasible for this project, I suddenly found myself faced with an obviously truncated story. Maia crosses the river, and then simply has nowhere else to go. I had faced a similar problem when working on an animation in my second year of graduate studies. The animation, titled *Tale Type 510A*, was an illustration of what a role playing game based on Cinderella might look

like. I had planned to tell the entirety of the Cinderella story, but this would have required a much longer animation and I would not have feasibly been able to complete the project in the allotted time. Because this was an animation based in game logic and not a full game, I was able abruptly end the animation by making the last shot a game over screen. This ending was in keeping with the animation's humorous tone, and was recognizable as an ending. Ironically a similar game over screen would not be recognizable as an ending within *Tiny Maia*. Despite its name, a game over screen does not mean that the game is over; it means the player should try again if they want to get the better ending.

In order to give *Tiny Maia*'s ending a greater sense of closure, I moved some of the planned interactions Maia would have with a non-player character (NPC) from the third level into the second level. This NPC is inspired by the prince Thumbelina meets when she finds her new home. In my original prototypes, the prince was introduced near the end of the second level. He could only be seen from a distance, and would fly away as Maia approached. The sunlight that allowed him to fly would disappear before Maia could go after him. More interactions were to take place in the third level.

Without the third level, the prince needed to take a greater role in the second level. The meeting between Maia and the prince was moved up to slight after the half-way point in the level. Maia sees him at a distance, and upon her approach he flies off the screen. This occurs a second time on the far bank of the pond. This serves to communicate to the player that there are other beings like Maia and foreshadows the ending.

The fact that the prince flies off the screen breaks the rules of the game world in a glaring way. Before that moment, the fact that Maia can only fly so high is unremarkable. Once the prince flies off the screen, players may well wonder why he can go places she cannot. The reason Maia cannot fly beyond the screen is rooted in the game, not the story. Likewise the reason the prince can fly beyond the game space is rooted in the story, not the game. The game space is not infinite, and the player has to stay within the game space; the game world on the other hand is infinite (or at least only limited by our ability to imagine it), and the prince can go to parts of the game world not included within the game space. One of the simplest methods of keeping the player from leaving the game space is to create an invisible wall. The top of the screen in this case is that invisible wall. Given more time and resources, a more elegant method of containing the player within the game space could have been developed. For example, perhaps Maia could falter and fall near the top of the screen. This method would be similar to how Naughty Dog solved the invisible wall problem in the *Uncharted* games; Nathan Drake turns around and walks back if the player tries to steer him down an unnecessary road. Another possible solution for this problem in *Tiny Maia* would be for the sunlight to fail when Maia reached the top of the screen. Another solution could be to redesign the level in order to hide the fact that the prince breaks the rules. Instead of flying off the screen, he could fly into a plant or other structure where Maia cannot find him.

One of the last mechanics which I implemented was Maia's ability to sit. The mechanic itself was inspired by similar sitting mechanics in *Journey*, *Brothers: A Tale of*

*Two Sons*, and *Proteus*. Sitting in games allows for a quiet contemplative moment and can be a type of rejection of the action based mechanics found everywhere else. *Brothers* makes particularly good use of sitting mechanics. When the brothers sit on a bench, the camera shifts to give the player a chance to take in whatever scene the brothers are observing. This can have direct gameplay benefits, when the view is overlooking a new area, or it can simply be a moment to observe the in-game landscape. In a few areas, sitting down triggers a scripted animation. These animated events add to the story and reward the player for taking time away from the main action.

The reason I felt *Tiny Maia* required a new mechanic was influenced by the *Books of Raksura*, a series of fantasy novels by Martha Wells. The Raksura are fictional creatures who, like the protagonist in my videogame, shape-shift between humanoid and winged forms. One aspect of Wells' character building that most struck me was the way in which the Raksura are fully themselves in both of their forms; neither shape is more valuable than the other even though the winged form is more powerful. This prompted my realization that Maia's winged and humanoid forms should be equally valuable, but the mechanics made it so that the winged form was more valuable. I didn't want the player to wish Maia was always in her winged form. A new mechanic was needed to add value to Maia's humanoid shape. The sitting mechanic provided this balance. Because Maia does not have legs in her winged form, it wouldn't make sense for her to sit while she has wings. Sitting also provided a transition between the first and second levels. When Maia leaves the first level, she sits on a flower petal and a gust of wind carries her out of the house.

Figure 9. Screen captures from *Tiny Maia*, illustrating the ending of each level

The ending of the game references the ending of the first level. When Maia comes across a tree stump, she cannot go any farther. A tree just past the stump blocks her way. The stump is near a rose bush, and one of the rose petals has fallen upon the stump. Just as the player needed to sit on the rose petal to exit the first level, the player now needs sit on the rose petal to end the game. The tree stump features a carving of a heart with an arrow through it, oriented so that the arrow points down. This provides some foreshadowing for the ending which involves finding another person. The arrow is also a reminder that the down arrow should be used. When Maia sits on the rose petal, the prince returns and sits near her. After about ten seconds the screen fades to white, marking the end of the experience. During that last ten seconds, the player is still in control of Maia. Continuing to sit requires the player to hold down the arrow key, meaning that sitting with the prince is an active choice on the part of the player. If the scope of this project were larger, I would have liked to create an interaction between

Maia and the prince if Maia remains seated, and another interaction if she stands up then sits closer to the prince, as opposed to if Maia walks away from him.

# Chapter 4: Synopses

## *Short Synopsis*

*Tiny Maia* is a story-based 2.5D exploration platformer, in which the player character shape-shifts into a flying creature. Players take the role of Maia, a diminutive being (not much larger than a thumb), as she wanders through a human-scale world. Clamber over books, fly between lily pads, and search the world for clues about Maia's life.

## *Long Synopsis*

When I created *Tiny Maia*, I set out to create a videogame that tells a story primarily through game mechanics. The motivation for this project was to discover what sort of narrative information could be conveyed by game mechanics, and what elements we need to take into consideration when designing storytelling game mechanics.

In order to do this, I developed game mechanics that were inspired by story elements. My initial interactive prototypes used non-representational graphics which helped me to determine which types of information were being conveyed by the mechanics alone, and which required visual theming. The creative process I used involved quick and repeated iteration between gameplay development and story development. This constant shifting between focus on game mechanics and storytelling

allowed me to focus the game mechanics on story, as well as to see how the gameplay was affecting the story.

*Tiny Maia* is inspired by Hans Christian Andersen's *Thumbelina*. The main shape-shifting flight mechanic is both a reference to and departure from this inspiration story. Thumbelina gains wings at the very end of her story when she finds a home in the sunny meadow. I wanted the player character to have more abilities and be less passive early on compared to the main character in *Thumbelina*. I also wanted to communicate the positive feelings that Maia has towards the sunlight. By giving Maia wings and allowing players to fly in the sunbeams, players tend to feel a rush of excitement and freedom upon entering the sunlight. Thus players feel what Maia would feel at this point.

Although I wanted Maia's flight to be fun and exciting, I didn't want the player to always want Maia to be in her winged form. A sitting mechanic that was later added helped to even out the value between her two forms. When Maia is flying, she has no legs. Instead of standing still, she flies in place. For this reason, when Maia is in her winged form, she cannot sit down. I knew that in order to give the player a reason to want Maia to occasionally be in her humanoid form, there would need to be reasons for her to sit down. Sitting in videogames is often about creating moments of quiet contemplation, but sometimes the act of sitting is an event trigger. In *Tiny Maia*, the player can sit anywhere at any time when Maia is humanoid and on the ground. However, sitting in certain places will trigger an event to happen. The events tied to the sitting mechanic are

important for the player to progress through the levels, thus Maia's forms have equivalent value and both forms are important aspects of her character.

The house in *Tiny Maia* is an amalgamation of places where I have lived and the things that populated those places. The windows are casement windows because those are the only proper windows in my opinion. An opinion I formed as a child living in an older house with old drafty casement windows. The writing desk is based on the writing desk my mother and I call the unicorn table, even though it's not a table and the unicorn statue that once lived there has long since broken and been discarded. The bookshelf is as near as I can make it to my sister's bookshelf, that caused my younger self to feel a great deal of envy.

The meanings of these objects are difficult to articulate, and the decision making process of choosing them was based more in feelings than logic. A few of the objects and settings have fairly straight forward reasons for being there. The lamp is there to provide a light source; the matryoshka dolls (given to me by my uncle who did business in Russia) are meant to signify scale and reinforce the importance of Maia's size relative to the environment.

The lily pond and its frog inhabitant in the second level are referencing *Thumbelina*; however the design of it is essentially a prettier version of the swamp near my childhood home where my siblings and I would look for frogs.

At the start of the game the main character, Maia, is not visible. We instead see an interior space. Focus is directed towards a blue bottle holding a single rose. As the player presses buttons (any button, all inputs will work at this stage), the flower releases sparkly "pollen" and begins to wilt. After 3 button presses, Maia emerges from the flower, and collapses on the windowsill. After some prodding, Maia stands up ready to explore her surroundings. The reason for beginning with random button presses is to help the player enter an exploratory state of mind. I want the player to be willing to try things just to see what happens. I don't want the player to be afraid or hesitant to try whatever comes to mind. When showing a game to a new person, they will inevitably ask "What do I do?" before trying anything. I've found the response I most like to give is "push buttons!"

After the initial sequence, the buttons do gain specific functions. To guide players at this point, I created a sticky note and applied it to the windowsill. Two arrows and a representation of the jump button are drawn upon the note, as though it was some note the occupant of the room made and then forgot. This is not much different from the standard tutorial text one might see at the beginning of a game; however the graphical style does blend with the environment in order to preserve a sense of a believable space.

Years of side-scrolling platformers (and of course the fact that we read left to right) has taught most players to immediately walk to the right. The first object the player will encounter to the right is a pencil, which can be jumped over. Next the player will encounter a book that cannot yet be jumped over. Without the pencil, I found that players may be confused about why they can't jump over the book. The pencil is there to teach the players that they are, in fact, jumping correctly, so that when they reach the book they

know there is something they need to do or find. At this point, the player needs to back-track to pick up the first bit of pollen from the rose. Picking up the pollen causes Maia to gain a greater ability to jump. When the pollen is first picked up, she draws attention to her legs, which is meant to reinforce the idea that the pollen has affected her jumping ability. Now when the player tries to jump over the books, the jump can easily be completed. This sequence teaches the function of the pollen.

Soon after leaving the windowsill, the player may spot another environmental clue. A slip of paper featuring a downward arrow is sticking out of a book. This arrow serves two purposes. The first and primary purpose is to prompt the player to press the down arrow key, which will cause Maia to sit down. This mechanic may seem pointless at first, but it gains usefulness later on. Secondarily, the arrow points the player in the direction of the next area to explore – the space below the writing desk.

When the player jumps down from the windowsill, the writing desk that makes up the next platform is clearly visible. However the screen cuts off the next area where the player must go. This creates what we refer to as a leap of faith. The reason for this level design is partly environment based. A writing desk needs to be a particular height to be believable, and the camera can only show so much at once without causing Maia to become even tinier and difficult to see. The other reason for including a leap of faith is to teach the player that Maia is a strong enough creature that she won't be hurt by a few long falls, and that this is ultimately a safe game world. The player's willingness to jump into the unknown will be rewarded, not punished.

Once on the ground, Maia appears to be trapped with nowhere to go. The player can collect another bit of pollen, and hear the sound of a window unlatching. However, Maia's jump height is still far too short to reach the writing desk and there is nowhere else Maia can reach. While Maia is under the writing desk a shaft of light breaks through the window and shines down to the floor. When the player directs Maia into the shaft of light, Maia changes. Her legs disappear; she sprouts wings, and gains the ability to fly. It is at this point that we start to understand what kind of creature Maia is.

My hope is that players experiencing this game will feel Maia's emotions along with her—the joy of flying in the sunlight, surprise at being "gobbled up" by the frog, and the calm comfort of sitting with the prince. I want players to imagine other such tiny stories playing out in other mundane spaces. We are all, at times, out of place. But just as Maia is only tiny in comparison to the human scale, being out of place is only a matter of context. My wish is that players will see something of themselves in Maia's story and come away from it just a little bit more willing to search for the place where they can be their best selves.

# Chapter 5: Evaluation of the Creative Research and Project Result

The purpose of this creative research was to investigate the following research questions:

*What design considerations must be used in order to explore the relationship between game mechanics and narrative?*

*How can the design of game mechanics focus on the conveyance of narrative so that the videogame's storytelling can rely less on other forms of non-interactive contextual information?*

In order to conduct this investigation, I created a story-driven videogame loosely based on a fairy tale by Hans Christian Andersen. Addressing the research questions required the use of a development process in which the story and gameplay were developed simultaneously. Additionally the graphics in the videogame were created in a series of passes, starting with abstract images and gradually replacing them with representational imagery. This gradual shift between abstraction and representation was a key component in attempting to untangle the communicative roles of the game mechanics and the visual theming.

The first design consideration to discuss is the need to be mindful of the order of development – does the story or the game come first? As discussed earlier in this paper, a common design methodology is to begin with an abstract set of game mechanics and use

those systems as a source for the later developed story. It is also possible to begin with a story idea which then seeds the design of the game mechanics. In either case it is important not to separate the story development from the game development. When focusing this study on the relationship of game mechanics to story, it was especially informative to use an iterative process of simultaneously developing the story and the game mechanics.

In the creation of *Tiny Maia*, I used a process which involved constantly shifting focus between the story and the mechanics. This enabled me to investigate the ways in which the story was affecting the meaning of the game mechanics and vice versa. I found that changing how a part of the game works can cause a change in the story. For example, I had developed a non-player character (NPC) frog which was initially meant to be an antagonist. At one point in development, the frog's antagonistic behaviors had to be removed. The frog's chasing behavior stayed in the game, but without the more hostile behaviors this NPC reads as a friendly companion. The more dramatic changes involved reorganizing the sequence of events. In the inspiration story, *Thumbelina*, the protagonist gains the ability to fly at the very end. To strengthen the game this flying ability was moved to near the beginning of *Tiny Maia*.

While building up the graphics for *Tiny Maia*, I found that some information could only be communicated through representational graphics. This may be an issue for many games, with the specific types of information being different depending on the story or limitations that the mechanics may afford. Among the information that required

visual theming for *Tiny Maia* were the following concepts: *scale, sense of place,* and *character/abilities*.

Perhaps because scale is relative, it could not be communicated through game mechanics alone. I had expected Maia's scale to not be apparent until there the representational environment was implemented, however I found that Maia's character model also needed to be implemented before players would recognize her as being small. When Maia was represented with an abstract shape in a representational world, players did not read her as small because they did not have an expectation for how large the abstract shape should be. Only once she was humanoid did players see her as being small. When communicating information that speaks to pre-existing expectations, the mechanics alone are generally not enough to get the idea across.

The connection between *Tiny Maia* and its source story *Thumbelina* did not become apparent to players until the flower and Maia were shown with representational images. Most of the connections between *Tiny Maia* and its inspiration are subtle and difficult to pick up on even for players familiar with *Thumbelina*. Although it is important for *Tiny Maia* to be able to stand on its own, I did want the connection to *Thumbelina* to be something that some players would observe. Without the opening image of a person emerging from a flower, players did not remark on its similarity with *Thumbelina*. Once the images were in place, some players would remark on it.

Certain in-game items can act as icons referencing common game mechanics. For example, spikes pretty much always mean death or game over. Jetpacks, capes, and

wings are often used to signal more complex or changing jump mechanics. In *Spate*, the player character Bluth is shown wearing a steampunk jetpack; this indicates that he can double jump. In *Spelunky*, the player can pick up either a jetpack or cape. Both items change the way that the player can jump. Maia's wings act as an icon that indicates how Maia's movement is changing. This is information that is best communicated through visual theming.

The slow building up of graphics helped to reveal what sorts of information are best communicated by the game's fiction. Using a design process which considers the fiction and its connection to the gameplay early on promotes cohesion between the two layers which are too often separate or at odds. Iteration is extremely important in this design process. By quickly constructing and altering both the fiction and the gameplay, the deficiencies and strengths of both can be uncovered. While iterating, designers should give consideration to how changes in the fiction or gameplay will necessitate changes in its counterpart. This is one method for developing videogames in which the fiction and gameplay are complementary.

One way in which *Tiny Maia* succeeds as a project is in creating a cohesive experience. Prior to this project, much of the game design work I had completed focused on learning or implementing one or two aspects of game design. This was an important step in the learning process; however it did produce work that was fundamentally incomplete. Controlling the scope of *Tiny Maia* allowed me to create a cohesive and complete, if small, videogame.

If I were to start the development process anew, there are few things I would do differently. The visual design choices that I made early on slowed down the early iterative process that was so crucial to this research. Using a faster to implement visual design process could have sped up my ability test how the representational visuals were affecting the game mechanics. The process I used involved prototyping the game mechanics, but then I jumped right in to production for the visual development. What I have learned from this experience is that it is important to prototype the fiction alongside the game mechanics. Even if the ultimate visual style requires time to implement, prototyping representational visuals can be used to test the story early on.

Another lesson I have learned from this production process, is that sound design should be considered very early on. To the unfortunate detriment to the game, I did not incorporate sounds until fairly late in the design process. Even simple sounds added greatly to the sense of place in each level. I believe that more developed sound design could have greatly improved the overall quality of *Tiny Maia*. In future projects, I would like to further explore this role sound design has in creating a sense of place and communicating to the player. It is possible that some of the information that couldn't be clearly communicated through the mechanics could be communicated through sound as well as imagery. I have focused on how game mechanics convey story and how those mechanics relate to game visuals, however there are actually three videogame elements that communicate in concert—the game system, the visuals, and the audio.

The fundamental design considerations that need to be kept in mind when designing game mechanics for storytelling are all centered on what kind of information is being conveyed to the player. Once the type of information that is being conveyed is identified, there is a series of questions that can be asked in order to help focus the design process. Is the information referencing the player expectations, such as scale in my example? If so, steps will need to be taken to ensure that those expectations are being invoked. Should the information be indicated through the use of a conventional icon, or would it be appropriate to build a game-specific icon and teach the player its meaning through gameplay? Perhaps an icon is unneeded and the information could be indicated through animation or other means. Can the story elements be broken into relationships that may not follow the original plotline? Can those relationships be explored by the player through the game mechanics rather than explained using non-interactive segments?

Asking these questions as design decisions are being made can help the game designer to choose the best means for telling a story and the best shape for that story to take. It is important to give consideration to both what the story is and how the story is being told. Whether a game designer starts with game mechanics or a story, in the finished product both the gameplay and fiction play a role in the storytelling.

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