Author: **Vang, Hue**

Title: ***Sun of the Children: Ludonarrativity in Abstract Character-Driven Game Design***

The accompanying research report is submitted to the **University of Wisconsin-Stout**, **Graduate School** in partial completion of the requirements for the

Graduate Degree/ Major: MFA in Design

Research Advisor: Kimberly Long Loken, Assistant Professor

Submission Term/Year: WinTerm 2018

Number of Pages: 49

Style Manual Used: American Psychological Association, 6th edition

☒ **I have adhered to the Graduate School Research Guide and have proofread my work.**
☒ **I understand that this creative thesis project must be officially approved by the Graduate School. Additionally, by signing and submitting this form, I (the author(s) or copyright owner) grant the University of Wisconsin-Stout the non-exclusive right to reproduce, translate, and/or distribute this submission (including abstract) worldwide in print and electronic format and in any medium, including but not limited to audio or video. If my research includes proprietary information, an agreement has been made between myself, the company, and the University to submit a thesis that meets course-specific learning outcomes and CAN be published. There will be no exceptions to this permission.**
☒ **I attest that the creative thesis project is my original work (that any copyrightable materials have been used with the permission of the original authors), and as such, it is automatically protected by the laws, rules, and regulations of the U.S. Copyright Office.**
☒ **My project chair has approved the content and quality of this paper.**

STUDENT:

NAME: **Hue Vang** **DATE:** **1-19-18**

ADVISOR: (Committee Chair if MS Plan A, MFA Creative Thesis, EdS Thesis, or Field Project/Problem):

NAME: **Kimberly Long Loken** **DATE:** **1-19-18**

This section for MS Plan A Thesis, MFA Creative Thesis, or EdS Thesis/Field Project papers only

Committee members (other than your advisor who is listed in the section above)

1. **CMTE MEMBER'S NAME:** Dave Beck **DATE:** **1-19-18**
2. **CMTE MEMBER'S NAME:** Andrew Williams **DATE:** **1-19-18**

This section to be completed by the Graduate School

This final research report has been approved by the Graduate School.

Director, Office of Graduate Studies: **DATE:**

Vang, Hue ***Sun of the Children: Ludonarrativity in Abstract Character-Driven Game Design***

Abstract

Sun of the Children is a 2D digital game that focuses on the issue of ludonarrative dissonance, a term coined by Clint Hocking that describes the disconnect between gameplay and story. This dissonance is present because of the use of cinematic cutscenes: verbal and written narration that are borrowed from film and literature to fill in the gaps of digital game storytelling that gameplay cannot clearly execute. By creating a new narrative model using ludonarrative mechanics, this exploratory creative thesis will implement and analyze devices such as detailed character animation states, responsive environments and qualitative game mechanics that arc in parallel with character development. By rejecting the use of cinematic cutscenes, verbal and/or textual storytelling, this project will further digital games' evolution toward integrated narrative experiences.

Acknowledgements

Foremost, I would like to thank Kim Loken for believing in me. As my committee chair, professor and mentor, her knowledge and kindness is nothing short of a gift. I am able to survive this journey because of the wisdom, patience and care she has sent my way. I will forever be grateful and hope I can one day do the same for future students finding their way in the field of art and design.

To the rest of my committee members, Dave Beck and Dr. Andrew Williams, thank you for always encouraging me and steering my ship in the right direction. Their leadership, dedication to their craft and advice over the years has taught me to become a better designer, artist and human being.

I would also like to express a warm thank you to Dr. Julie Peterson, my MFA advisor, who has bestowed me every chance to succeed; her maternal guidance, wisdom and motivation given to my cohorts and I was present every step of the way.

I would also like to acknowledge Dr. Seth Berrier and Jesse Woodward who gave their time, creative insight and technical expertise to support the production of this project. Also to the faculty and staff at UW Stout who have helped me through all my years as a student, thank you.

I thank my brother Chuewa for all the programming, late nights and game builds he prepared for me. Playtesters, I thank you as well for your valuable feedback.

Finally, to my family and friends who have supported me throughout and to my parents Zonglaar Vang and Neng Her Vang; words cannot describe my gratitude for their sacrifice, love and care given to me. Thank for never giving up on me. This accomplishment would not have been possible without them.

Table of Contents

List of Figures

Chapter I: Introduction

The 'scene-title card-scene' model in early film is analogous to today's 'gameplay-cutscene-gameplay' structure. One can argue that film referenced the narrative structure of prints, photography and comic strips to sufficiently tell a story for a new, unexplored medium. In time, the introduction of camera angles, sound, color and special effects allowed films to evolve into a robust and artful narrative medium. Although the 'gameplay-cutscene-gameplay' structure in narrative games is an effective storytelling device, it limits the maturation of this genre by languishing in convention.

We are creatures obsessed and imprisoned by the idea of time. The notion of the past, present and future parallels the narrative model of a beginning, middle and end that creates meaning to the perceiver. In a survey conducted by the Entertainment Software Association (ESA), 16% of all video game purchases in 2015 were influenced by the games' narrative or premise (Entertainment Software Association [ESA], 2016). The following year this interest increased to 59% (ESA, 2017). This shows the interest that players have in storytelling as well as the influence of good storytelling has had from the medium.

This increase may be reassuring for narrative game designers, but according to Keith Fuller, production contractor for Activision, 90% of players who begin a game will never see the end unless they decide to watch it on YouTube (Snow, 2011). "The last thing [people] do is read the manual," states game designer and creator of *The Sims* (2000), Will Wright. "Instead, they pick up the controller and start mashing buttons to see what happens" (Wright, 2006). If we consider mark-making as a means of communicating, an analogy can be made to digital game controls. A button represents, or facilitates action and reaction within the game. This meaning is learned through gameplay and requires work from the user. Some of these marks, or controls,

are now codified: “space bar to jump”. But, fundamentally, players must learn a new language to experience the medium. Input from the player can add interest or stress that isn’t present in other narrative platforms. It is not necessary, for example, to learn a new language to understand *every* film or piece of literature one seeks. Though not as complicated as a formal language, learning which button activates which action within the game can be overwhelming and if poorly designed, can cause players to lose interest before the narrative unfolds. This is how games can be polarizing among varied audiences: the added work required of the user can result in exclusivity (which makes watching a game unfold on YouTube more desirable). Designing a game to capture the ‘look’ (environmental art, character design) *and* the ‘feel’ (narrative theme) is a critical element for gamer engagement and retention. Games lacking in successful expression of narrative theme, one can argue, results in decrease player motivation. This ‘added work’ of interactivity is suddenly not worth the effort for an enjoyable narrative experience, hence, YouTube. One can assume they recognized a continuing gameplay pattern, mastered it, and quit because they simply got bored.

In Raph Koster’s book, *A Theory of Fun for Game Design*, the author shared his children’s experience of learning the game of Tic-Tac-Toe. Session after session, they learned the patterns and quickly mastered the game; boredom set in and they redirected to something more challenging. Koster concluded that the brain is hard-wired to pick up patterns; once we understand the patterns, we yearn for fresh new ones to conquer (Koster, 2005). As teenagers or adults, we are more aware of this experience.

Furthermore, this demonstrates that games help individuals stimulate the brain, preparing their minds for ever greater challenges. Because of this instinctive drive, well-designed games can become valuable tools or consuming addiction for individuals of all ages because “with

games, learning is the drug" (Koster, 2005). Studies in the past have concluded that those who play games have a beneficial effect on complex spatial tasks (Spence & Feng, 2010), enhance brain cognition for the elderly (Ballesteros et al., 2014) and improved multitasking skills (Université de Genève, 2017).

Therefore, if (a) the interest to purchase games because of their story has increased and (b) games can help improve the brain cognition of individuals, then the onus is on us, the game creators and developers, to challenge the status quo of narrative games. The current structure of the 'gameplay-cutscene-gameplay' has become outdated.

Purpose of the Project

This exploratory creative thesis analyzes the mainstream narrative digital game design model to develop one that omits the traditional use of cutscenes, dialogue and verbal narration with observational research on player experience. This new model that pairs game mechanics with ludonarrative mechanics will be utilized in *Sun of the Children*, a 2D narrative digital game.

Definition of Terms

For the purpose of clarification, the important terms used in this thesis have been defined.

AAA games. Pronounced "triple-A games", is generally a title developed by a large studio, funded by a multi-million-dollar budget (Schultz, 2017).

Abstract game. A strategy game that minimizes luck and does not rely on a theme.

Aesthetic distance. A degree of detachment from or nonidentification with the characters or circumstances of a work of art, permitting the formation of judgments based on aesthetic rather than extra-aesthetic criteria (Bullough, 1912).

Chance observation. "[A] method…used to liberate [one's] own mind from clichéd ideas and invent unpredictable movements" (Walker Art Center, 2009).

Cut-scene. A non-interactive narrative segment of a videogame that frequently employs the communication conventions of cinema.

Emergent gameplay. The appearance of new possibilities that arise from the interplay between game mechanics (Juul, 2005).

Indie game. The business of making games without the support of a publisher (Parker, 2011)

Ludonarrative. The intersection in a video game of ludic (gameplay) elements and narrative elements (Hocking, 2007).

Ludonarrativity. The quality or condition of presenting a narrative in a game.

Ludonarrative mechanics. Constructs of rules or methods designed for interaction that synchronizes gameplay and story, thus expressing a theme.

Ludology. The study of games and gaming, especially video games (Ludology, 2017).

Ludus. Structured activities with explicit rules; game (Caillois, 1961).

Moore's law. The processor speeds, or overall processing power for computers will double every two years ("Moore's Law," n.d.)

Narrativity. The quality or condition of presenting a narrative (Narrativity, 2017).

Narratology. The branch of knowledge or criticism that deals with the structure and function of narrative and its themes, conventions, and symbols (Narratology, 2017).

Paidia. Spontaneous manifestations of the play instinct: *A cat entangled in a ball of wool* (Caillois, 1961).

Possibility space. The space within a digital game world where a player can experience all possible outcomes (Wright, 2006).

Project Objectives

The objectives of this thesis are as follows:

1. Creation of a narrative for a digital game.
2. Design functional game mechanics and ludonarrative mechanics based on the narrative.
3. Test the mechanics using observational research of player experience.
4. Provide a proof of concept demonstrating the ludonarrative mechanics.

Assumptions of the Project

This section will discuss areas in this thesis that are accepted as true. As an exploratory project, a proof of concept to demonstrate ludonarrativity is intended for further development. The popularity of mainstream digital games have created player expectations, such as the concern of ludonarrative dissonance.

Proof of concept. This game, *Sun of the Children*, is not the only experiment in the congruence of game and story but an attempt to re-wire the ideas of game narration. This project attempts to join the nascent research in cinema-independent digital game narrative structures. The game developed and playtested during the writing of this thesis is a proof-of-concept; it is intended to evolve further in the future with a larger development team.

Player expectations. The project outcome may be such that only players with proficiency in this genre will embrace the changes; or, the proficient players may reject experimentation while new audiences find an invitation to the medium that was previously lacking. According to Hartmann and Klimmt (2006), proficient players have high expectations

for their gaming skills; they will succeed often but stress over their few failures, whereas novice players will frequently fail without disappointment or frustration. Art invites subjectivity but design can be evaluated in the context of a function or goal. This evaluation can be used for the advancement of narrativity in this genre, or could potentially give rise to a new one as this game identifies itself as a ludonarrative game.

Ludonarrative dissonance. Coined by game writer and designer Clint Hocking in his critique of 2K Game's *BioShock* (2007), ludonarrative dissonance is the disconnect between the game mechanics and the narrative structure that spoils the aesthetic distance of a game (Hocking, 2007). This term has a negative connotation to audiences and developers who are familiar with the genre because of its presence in popular AAA games. In Naughty Dog's third-person action adventure game, *Uncharted 4: A Thief's End* (2016), when players kill 1,000 enemies, they are awarded with the trophy "Ludonarrative Dissonance", mocking the criticism of the protagonist, Drake, as a likable character (during cutscenes) who is also a mass murderer (during gameplay). "This is my proudest moment, the fact that I came up with this trophy on this project," stated Naughty Dog's creative director Neil Drukmann. "We were conscious to have fewer fights but it came more from a desire to have a different kind of pacing than to answer the "ludonarrative dissonance" argument. Because we don't buy into it" (Suellentrop, 2016). Using the label of "ludonarrative" may invite criticism from audiences before they experience *Sun of the Children*.

Limitations of the Project

Over the decades that digital games have existed, certain designs have become ingrained to players and developers. This project will implicitly break expectations, such as the button mapping schemes/character control and, use/non-use of a start screen, intros, outros, cutscenes, dialogue. As such, player reactions to the project may skew from acceptance (discovery) to

ambivalence (basic understanding, but without emotional investment) to rejection (confusion). For this thesis, the first act will be realized as a proof-of-concept; development of the full, three act game for competition entry and publication will continue after the thesis.

This game as mentioned, has three acts and is currently being created by two people, the author (story, concept art, animation, asset creation) and a programmer/technical artist, Chuewa Vang. With a two-person team, each act will take about a year to create. The game exhibited alongside this paper will not be the final, full version intended by the author but a playable prototype of his narrative hypothesis.

Chapter II: Background and Related Work

Digital games were an experiment and demonstrations of the advancement of science and technology; storytelling was not a consideration. The following chapter will cover the meaning behind play, the genre's influences, a brief narrative game history and current narrative game techniques.

Ludus and Paidia

Coined by French sociologist Roger Caillois in his book *Man, Play and Games*, ludus and paidia (Caillois, 1961) exist in a continuum and defining them at any given moment during gameplay can be difficult. But in theory, at one end of the spectrum exists paidia, a free and voluntary activity that occurs in a pure space, isolated and protected from the rest of the game world. Controlling a character to run repeatedly in circles for no reason within the game world is an example of paidic gameplay. What makes this tricky is metagaming (Jensen, 2013), where a player experiencing paidic gameplay can reinforce her own rules outside the game world or with other players. For example, the group could decide that whoever controls their character to run around the fastest is pardoned from household chores. With rules, suddenly paidia becomes ludus, which is at the other end of the spectrum. It is defined as playfulness guarded by rules, which is essentially a *game*. Balancing these two ideas control the pace of a game and helps reveal the narrative. Paidic gameplay, ironically, is a means for players to 'escape' the stress they may encounter during a difficult level of a game. Like a pendulum, the gameplay must swing back and forth in the paidia-ludus continuum for an enjoyable gaming experience. Any time the gameplay stays in one direction for too long, the game will either become meaningless, boring, too easy, too hard or uninteresting.

Ludology vs Narratology

The debate between story and gameplay has been around since the 1990s and although it has cooled, the digital games platform has yet to see one definitive philosophy rise over the other. Ludologists believe that the unification of gameplay and story contradicts the purpose of a game, that games should not be analyzed by story. Narratologists believe that story and gameplay can coexist and should be narratively analyzed. When a narrative is introduced to any medium, it does not exist in the present. The story beats were already written and strategically sequenced to establish a meaningful experience for the user. Once engaged with the medium--reading the first page, pressing play--their journey with the story begins. This can create linear gameplay, taking 'control' away from the player in order to service the story. Narratologists use emergent gameplay to counter linearity by creating vast interactive open worlds, optional exposition and side quests. From the ludologist's point of view, gameplay happens in the present. The future should be dictated upon the choices the player makes, creating unpredictable outcomes. Players are then rewarded by making the correct choice in real-time. The narrative then becomes the player's experience of thrill, joy, or frustration playing the game in the real world. If a story is added, ludologists feel real-time choices and unpredictable outcomes are rendered meaningless, because A will always lead to B, thus ruining the experience of a 'game'. Both are compelling; but gains in this medium may not be served by semantic wars or binary views.

Brief History of Narrative and Digital Games

Narration is communication. Using Marshall Poe's Evolution of Communication (Figure 1), we can also get the backbone of narrative history:

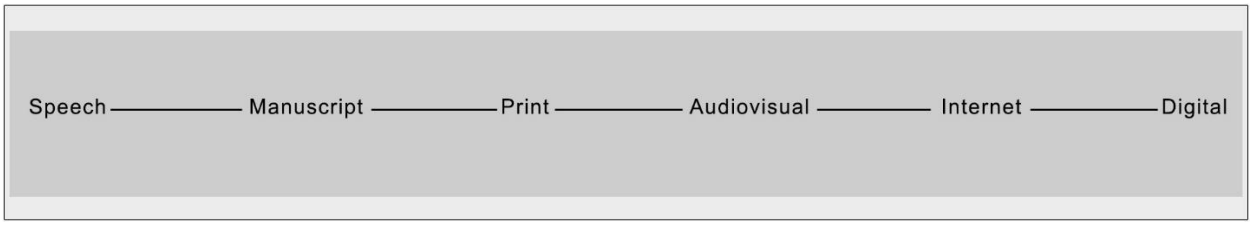

Figure 1. Marshall Poe's evolution of communication (Poe, 2011). Manuscripts are inclusive to all mediums created by hand as the final rendition.

If we branch out from these specific areas, we can trace a general timeline of the narrative medium (Figure 2). As the chart indicates below, digital games and VR are at the forefront of the evolution of narration and communication.

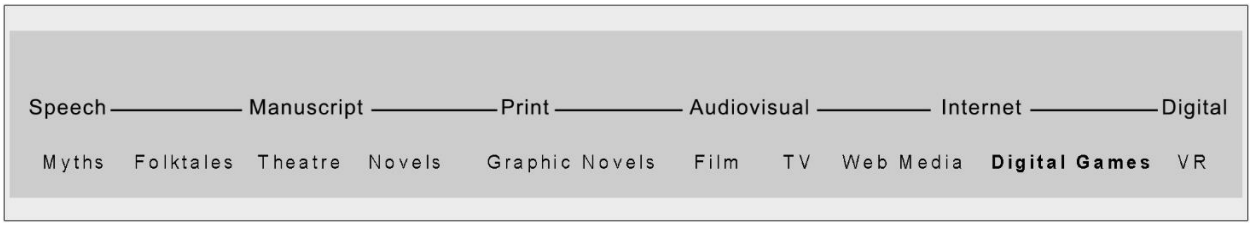

Figure 2. General timeline of prominent narrative mediums.

Referencing *History of Digital Games: Developments in Art, Design and Interaction* by Andrew Williams (Williams, 2017), we can go a step further and chart a timeline for digital games (Figure 3):

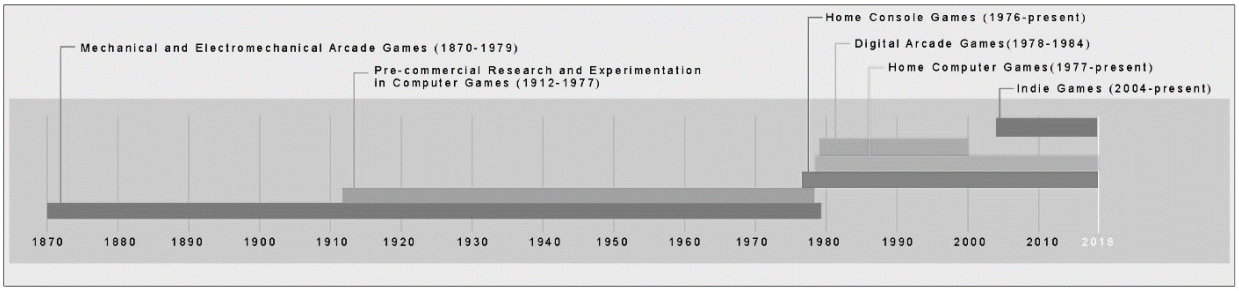

Figure 3. History of Digital Games. The bars represent the novelty era of each phase.

As Figure 3 indicates, the 1970s had an impact on the growth of digital games as home computer games, console games and digital arcades games grew in popularity. Moving toward present day, independent games, or indie games take precedence. Figure 3 demonstrates that each phase becomes shorter. This makes sense in the context of Moore's Law; as technology improves, so does innovation at an ever-faster rate. The rise of the Extended Realities (XR) including: Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (MR) may be the new mainstream milestone for narrative games – and may prove to be essential tools for fully achieving ludonarrativity.

The Evolution of Film and its Implications

Film has come a long way since its inception. The technical and narrative influences that Walt Disney's *Snow White and the Seven Dwarfs* (1938), Orson Welles's *Citizen Kane* (1941), Jean-Luc Godard's *Breathless* (1961) and Quentin Tarantino's *Pulp Fiction* (1994) had on filmmaking can be applied to the evolution of narrative games.

Snow White and the Seven Dwarfs is the culmination of early twentieth century innovation in the field of animation. The process of hand-drawn animation, though tedious, gave spark to storytellers the ability to create narratives beyond the limitations of a physical set, props and actors. *Citizen Kane* used cinematography and character perspectives to imitate our perception of the real world or to convey character emotions beyond a single protagonist, thus increasing immersion and interest. *Breathless* broke away from a structural approach to narrative, using long takes and jump cuts; these cinematic techniques expressed existential themes that dialogue and camera angles could not. *Pulp Fiction* used non-linear structure and unconventional characters stylistically, executing an unpredictable narrativity. These films

focused and manipulated the techniques of cinema to fully embody their themes. Game mechanics should be treated the same way, as tools of ludus *and* of narration.

Chance Operations and its Implications

The work of Merce Cunningham and John Cage sought out the independence of dance and music. They developed a term called *chance operations* (Walker Art Center, 2009) and it opened new areas and possibilities of musical narrative. Their goal was not to use their bias and taste to judge what dance and music should be but to let chance bring them together. This coupling is similar to story and game, instead this project does the opposite in bringing together game and story. The use of dynamic music during gameplay is an example of chance operation at work.

The Changeling. With chance operations, Cunningham and Cage would create their work separately then engage them together. In their work, *Changeling* (1957), possible movements for the head, torso, arms, and legs were created separately then recombined using a series of coin tosses. The result was an otherworldly experience, but justifiably so by their narrative. A "changeling" is a lifeform guised as a human; its expression as our species is the interpretive dance sequence.

Early Narrative Games

The first widely popular digital games such as *Spacewar!* (1962) or *Pong* (1972) were abstract games. One can argue that *Spacewar!* had a narrative, but it was fundamentally a graphic abstraction with an evocative title. The success of the film *Star Wars* (1977) likely influenced the genre evocation of *Space Invaders* (1978), but it significantly enhanced the player experience as it was the first game to incorporate music to set the mood and pace. *Pac-Man* (1980) was one of the first video game character that was anthropomorphized in that he ate food, especially

healthy food such as fruits to gain an advantage. *Pac-Man* was also given a girlfriend, *Ms. Pac Man* (1981) and is considered the first game to utilize cutscenes in between levels to showcase a narrative. Text-based adventure games were popular as well, such as *Colossal Cave Adventure* (1976) and *Zork* (1977). Works such as *Dragon's Lair* (1983) were interactive animations, not games; it essentially modeled a 'choose your own adventure' book in the form of animation which strips gameplay down to its bare bones; in fact, paidia no longer exists. Video games lacked engaging graphics in this era, so developers resorted to describing the situation using text alongside visuals. It wasn't until after the video game crash of 1983 that strong narrative games with a human protagonist started to appear. *Mario Bros* (1985), *Final Fantasy* (1987), and *Ninja Gaiden* (1988) began to incorporate stronger elements of narrative such as the emergence of cinematic cutscenes, 3D graphics, the usage of literary and musical themes.

Evolution of Narrative Tools in Games

Text-based games, text boxes and dialogue boxes were used during the inception of game narration. The evolution from 8bit to 64bit allowed artists to take advantage of visual storytelling in the early 1990s as well as character-voice overs. As real-time 3D games emerged, narratives were presented through spectacular cutscenes. The use of a virtual camera in 3D space and lighting gave developers the tools to establish a cinematic experience in between gameplay to create the narrative structure of a beginning, middle and end.

Games by thatgamecompany such as *Flow* (2006), *Flower* (2009) and *Journey* (2012) have focused on a poetic approach of narration in games. These games focused on a non-linear approach that told stories using their backgrounds and character interaction. Their goal was to create an emotional experience without the use of words. “I think words complicate things,” states Jenova Chen, game designer and co-creator of thatgamecompany. “Our vocabulary is

limited. There are words that exist in one language and not in another language. It creates barriers that keep us from understanding each other" (Takahashi, 2013). With Playdead's *Limbo* (2010) and *Inside* (2016) the developers also used atmosphere and background art to set the narrative.

Other narrative games such as Jason Rohrer's *Passage* (2007), The Chinese Room's *Dear Esther* (2012) and David Kanga's *Proteus* (2013) stand as works of art. These games are short, using game mechanics, metaphoric visuals and real-world time to express the theme of life and death. In *Passage*, as the player moves from left to right on screen, the background behind the character becomes fuzzy, expressing the fact that our memories blur as time passes. At a certain duration, the character abruptly dies and the game ends; which portrays the uncertainty of death and humanity's mortality.

Dynamic music can supplement or provide such information now. This is one of the traits games can borrow from film. Digital games in the past have implemented adaptive music, such as with iMUSE which was developed by Michael Land and Peter McConnell for *Monkey Island 2: LeChuck's Revenge* (1991). iMUSE was a system that allowed developers to control a smooth transition from one piece of music to the next – and, in the game, from scene to scene. Such synthesis and immersion is a cornerstone of this thesis. Horizontal resequencing and vertical re-orchestration will both be utilized to create dynamic music in *Sun of the Children*; further, this precedent can be extrapolated to inform other intrinsic ludonarrative elements.

Chapter III: Design Methodology

This chapter will cover the sections of the design methodology and the different phases of the project. Six phases are planned to complete the project; a list of materials and participant selection is included.

Design Methodology

The design methods are structured into six phases:

Phase one. Develop a story, its characters and a music/audio environment. To manage subjectivity of interpretation, the story will take influences from origin myths. Using a story that players are already familiar with, such as *Cinderella* or *The Three Little Pigs* would contaminate the effectiveness of testing the narrative mechanics, as player memory would emerge as narrator or even tutor.

Phase Two. Design ludonarrative mechanics based on the themes of the narrative in phase one by using the provocation creative technique developed by Edward de Bono (Herrmann & Felfe, 2014):

1. State what has been taken for granted.
2. Provocations are developed by cancelling or reversing what has been taken for granted.
3. Choose the boldest or most insane provocation.
4. Generate new ideas from the chosen provocation that can be realistically executed.

Phase three. Creation of a prototype of the ludonarrative mechanics in the Unreal Engine that matches the motivations of the characters to evaluate core functionality and enjoyment. After necessary adjustments are made, art assets will be placed into engine for the first round of observational playtesting. At this point, music creation by a third-party will

commence. Simultaneously, environment concept art, character design, storyboards and animatics will begin to explore the look and feel of the game.

Phase four. Final art concepts for the characters and backgrounds will inform asset production in Adobe Photoshop and Maya. A list of all animation states, such as the idle, walk, run, etc., will be created for all characters. Depending on the level of detail, each asset will vary in production length. The goal is to re-use assets to decrease production time, accented by feature elements with unique aesthetic qualities. Game mechanics will be functional and level design will be testable. Art assets will incrementally replace placeholder objects in the game. These are early tests to evaluate quality, limitations of technology, scope and bugs to create the most efficient pipeline for production.

Phase five. This phase, called waterfall, is pure production once an effective pipeline is configured. Much like a conveyor belt, art assets are made, assembled and packaged into the game engine where the programmers will unpackage the asset and plug the them in their necessary play space. At this time, technical art will be generated, such as particles, water simulation, rag doll and physics simulations. Equally important is the placement of lighting, type, intensity and color. Waterfall will be the bulk of development. Production will cycle continuously at this point until the desired results are achieved, as per the observation of informal playtesting. Playtest feedback will inform new tasks and pivots for each sprint. A sprint is an allotted time for prioritized goals in the design, art and programming areas to be met. Sprints can last from three weeks up to three months depending on the momentum of development and scope of the project.

Phase six. The game is ready to be published online. All game-breaking bugs are fixed. All art is final. Marketing of the game is launched with a website and social media pages.

Potential presentations, and competitions at game conferences will be perused. Interest from players via online reviews, ratings and commentary will inform the future direction of this project.

Materials

The materials are broken down into hardware, software and miscellaneous components respectfully.

Hardware:

- Drawing Tablet and Pen Stylus
- Minimum of two Workstation Personal Computers (PC)
- Monitor, Keyboard & Mouse per PC
- Xbox game controllers
- Headsets

Software:

- Adobe Photoshop
- Adobe Premiere
- Adobe Audition
- Autodesk Maya 2018
- Sprite Illuminator
- Unreal Engine 4.13
- Microsoft Word
- Fruity Loops
- Trello
- Zbrush

Miscellaneous:

- Sketchbook
- Graph paper
- Writing Utensils
- Storyboards
- Online Sound FX Library
- Online tutorials

Chapter IV: Sun of the Children

Sun of the Children (Figure 4) is a 2.5D character-driven narrative digital sidescroller game that endeavors to combine real-time storytelling and gameplay together without the use of cutscenes, verbal or textual narration. Inspired by mythology, culture and nature, *Sun of the Children* focuses on game mechanics and ludonarrative mechanics as storytelling devices to improve the narrativity of this genre. This project hopes to lay the tracks of curiosity into the heart of latent storytelling devices in the digital games platform that can revolutionize the way we interactively experience story.

Figure 4. Sun of the Children key art.

Project

In *Sun of the Children*, the player must unite the two protagonists, Stardust Boy and Grasshair Girl, by growing trees and moving platforms that are unique to each Act (Figure 5).

Figure 5. Environmental concept art of the tree and island. The characters of Stardust Boy (top) and Grasshair Girl (bottom) are placed within the world to showcase scale.

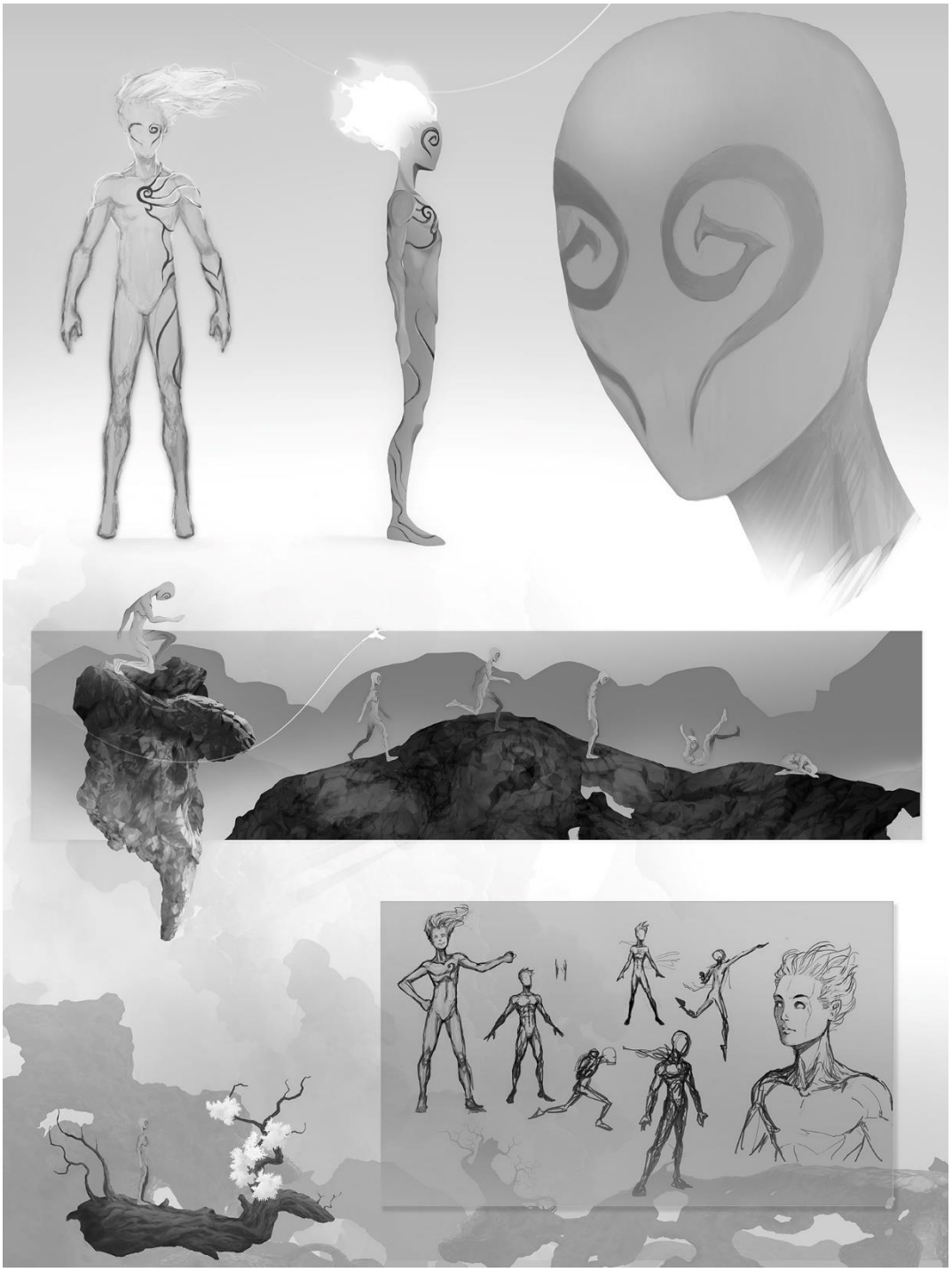

Figure 6. Stardust Boy character art. This character is representative of fire and light. His fiery hair is also the bird that he can emit. When the bird is emitted, he can move objects and becomes 'hairless.'

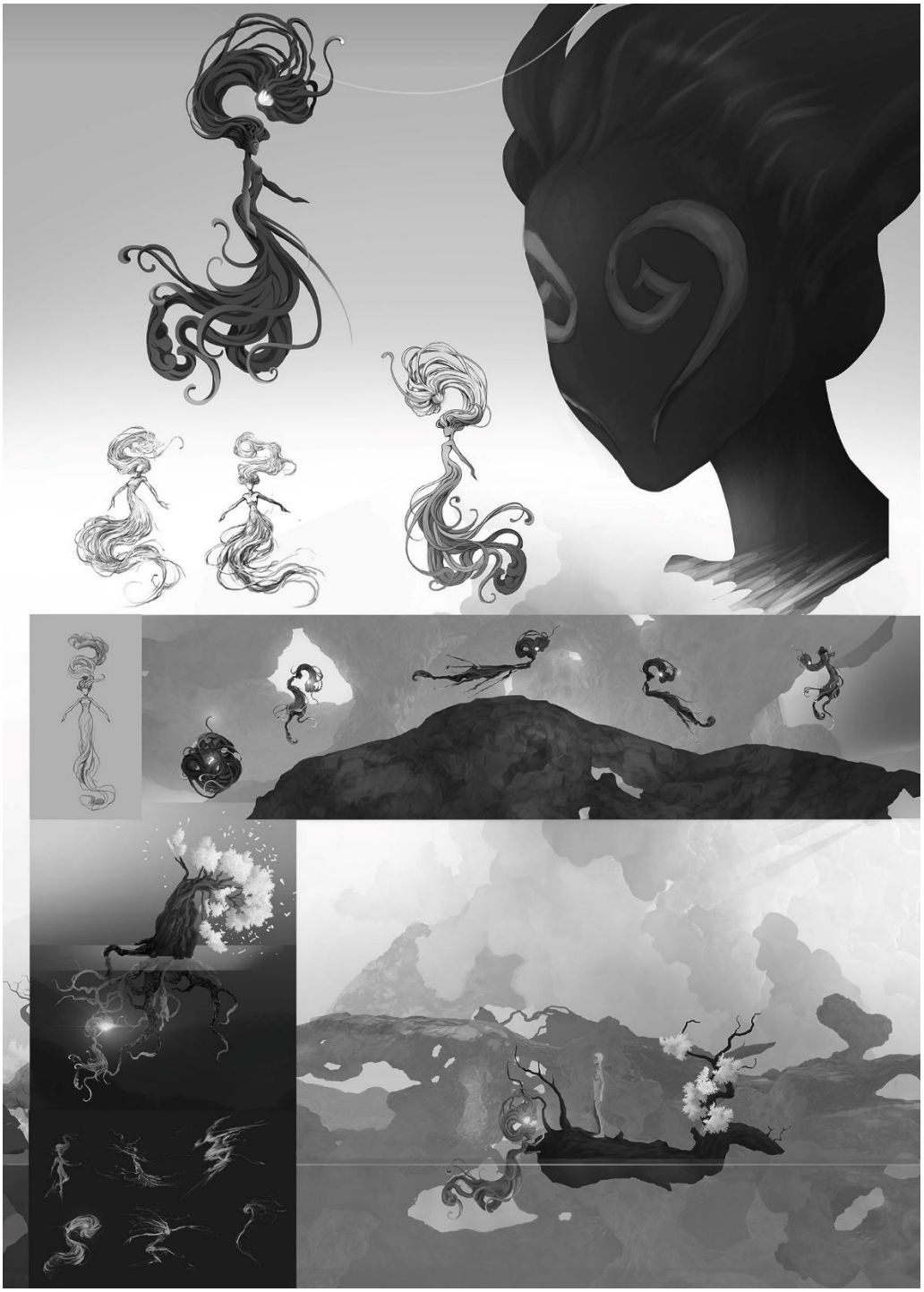

Figure 7. Grasshair Girl character art. This character is representative of plants and the earth. The distinct design on their face was inspired by Hmong symbols of love and longevity.

Ludonarrative Mechanics

The gap between typical current story devices in games (cutscenes, verbal or oral narration, text) and game mechanics (run, walk, jump, punch) is substantial. Game mechanics show the 'look' of an action, idea or emotion but they cannot express them. A character may look angry in a game, but *how* do they feel angry? By focusing on the feeling of a game mechanic, we begin to understand the potential of ludonarrative mechanics.

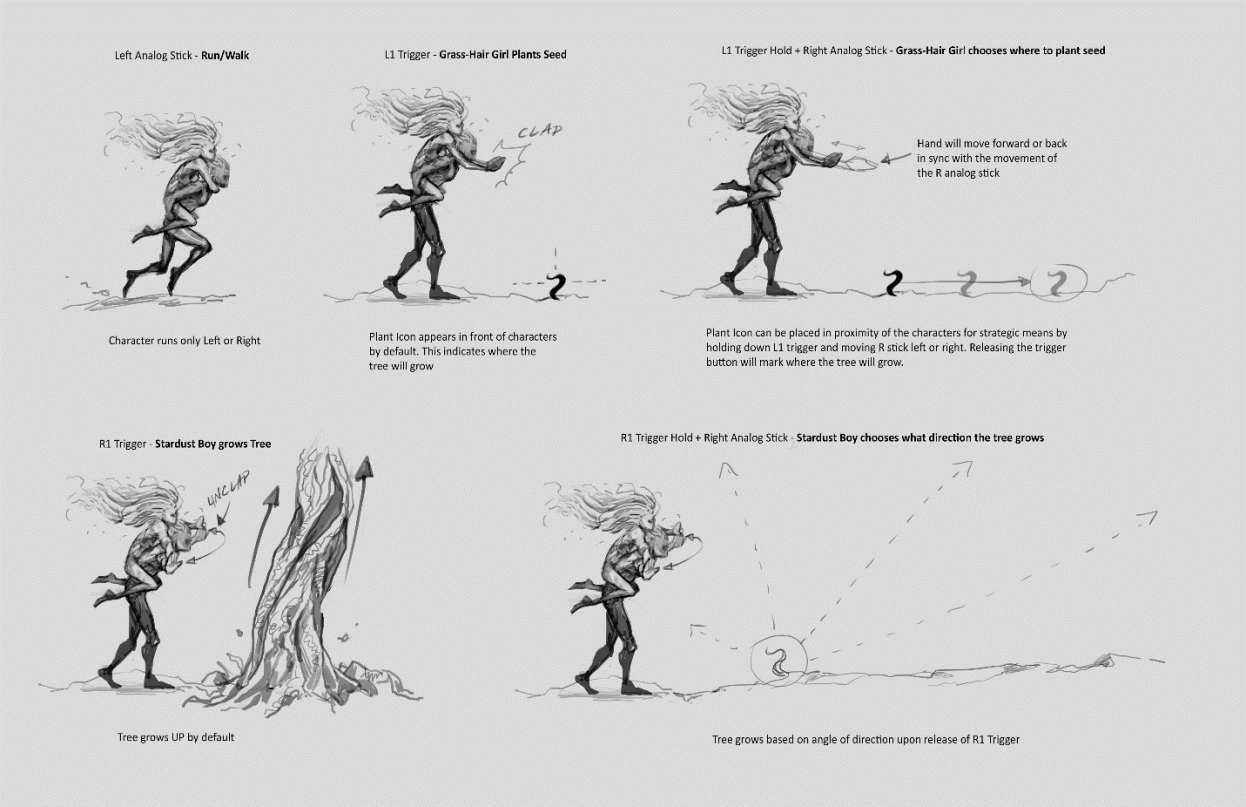

Figure 8. First draft of game and ludonarrative mechanics. This involved a clapping and un-clapping mechanic.

Story and Game Mechanics

There are three acts to this game, each with a unique theme. A specific narrative, game mechanics and ludonarrative mechanics are designed to express the theme.

Act 01. The theme is Longing. The narrative and mechanics are as follows:

Narrative. Two hummingbirds from the old world find themselves reincarnated from the source of a dying sun. As they fall onto the world, fate constrains them by the elements, one on land, Stardust Boy, and the other in water, Grasshair Girl. As the world transitions from old to new, their curiosity for each other grows. Their separation of the elements creates a longing for one another, leading the two characters to help each other survive in pursuit of their union

Game mechanics for Stardust Boy. Stardust Boy is able to move platforms by colliding onto them an orb of light in the form of a bird. Absorbing fruits grown by Grasshair Girl will upgrade his power to move larger platforms.

Game mechanics for Grasshair Girl. Grasshair girl is able grow trees by contacting glowing roots underwater. These trees make the world stay in color and produce fruits for Stardust Boy to gain more power. More power by Stardust Boy allows him to move larger platforms that prevent Grasshair Girl from moving forward.

Ludonarrative mechanics to express longing. The world is gray, but increases in color saturation as the two characters near each other.

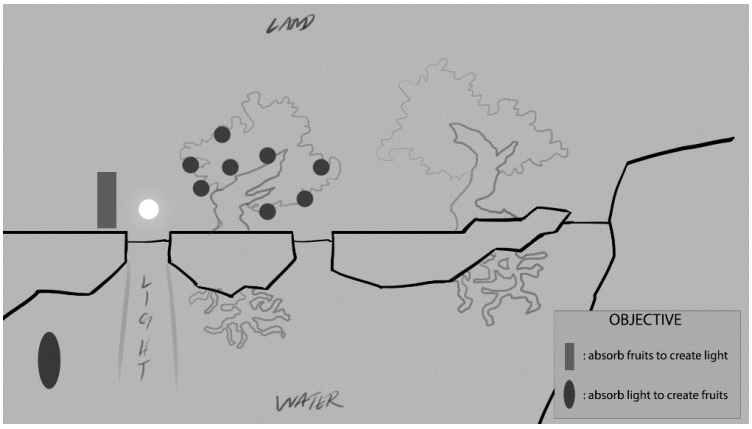

Figure 9. Second draft of game mechanics for *Sun of the Children.* This figure shows the early relationship between Stardust Boy (rectangle) and Grasshair Girl (oval).

Act 02. Unity and Lost represent the themes for this act. The narrative and mechanics are as follows:

Narrative. Once united, their strengths and their fears become one. Held hand in hand, Stardust Boy protects Grasshair Girl from light and fire that can burn her while she protects him from water and rain that can dissolve him. Together, their growth from longing turned into love, saturating the world with color and joy. But as they journey onward, time catches up to them like it did the dying sun. They become old and gray. As the old sun left the world behind, the other left along and the other left alone. Depending on the previous choices by the player, either Grasshair Girl or Stardust Boy will pass.

Game mechanics. The game shifts to 3D. Stardust Boy and Grasshair Girl combine into a bird-like creature, they fly and grow the world of trees and flowers.

Ludonarrative mechanics to express unity and lost. Characters and environment transition from 2D to 3D in Union. Characters and environment transition from 3D to 2D in Lost.

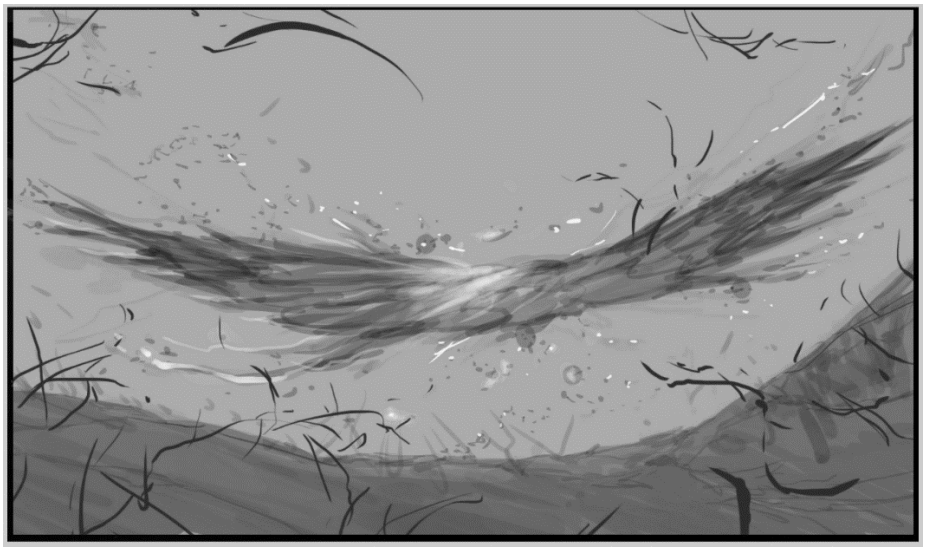

Figure 10. Concept art of the bird in union.

Act 03. Reunion is the final theme. The narrative and mechanics are as follows:

Narrative. As one wanders alone in a world white with snow and ice, they soon realize that the other is never gone but a part of the world. If Grasshair girl is gone, her image is drawn by the branches, clouds and skyline. Every visage of her that Stardust Boy finds saturates the world back into color. At those areas she is with him, it gives him the protection against water. He swims through the water and up a waterfall that soon becomes her hair. It turns out, she was always with him, but as part of nature. Their reunion grows the final tree, blossoming the final fruit and absorbed by the boy. He turns into the new Sun to nurture the world. The plants, trees, animals are then reborn. They are the children, experiencing the world, only this time, with a warm, healthy Sun and a green world full of grass. Two hummingbirds emerge and the cycle renews.

Game mechanic. Character walks left and right. Character also has the same game mechanics from Act 01.

Ludonarrative mechanic to express reunion. Character and environment returns to 2D. Parallax effect of backgrounds act as a layered jigsaw puzzle such that when moving left and right as Stardust Boy, the alignment of planes will provide a momentary glimpse of the figure of Grasshair Girl. Player is rewarded with a fruit each time they locate her.

Gameplay

The character on land, Stardust Boy, is controlled with the left analog stick and the character underwater, Grasshair Girl, is controlled with the right analog stick. These characters are separated by land and water. Stardust Boy will dissolve if he falls in water, prompting an end game. Grasshair Girl has no hazards, but cannot go above the surface of the water and can remain trapped in the water space if there are large rocks barricading her way.

Pipeline

The pipeline demands contribution from design, art and programming. The narrative is the driving force of the workflow. As Figure 11 indicates, art is at the heart of the pipeline, guarded by the narrative, design and programming. Numbers one through six represent the different design methodology phases of the project mentioned in chapter three.

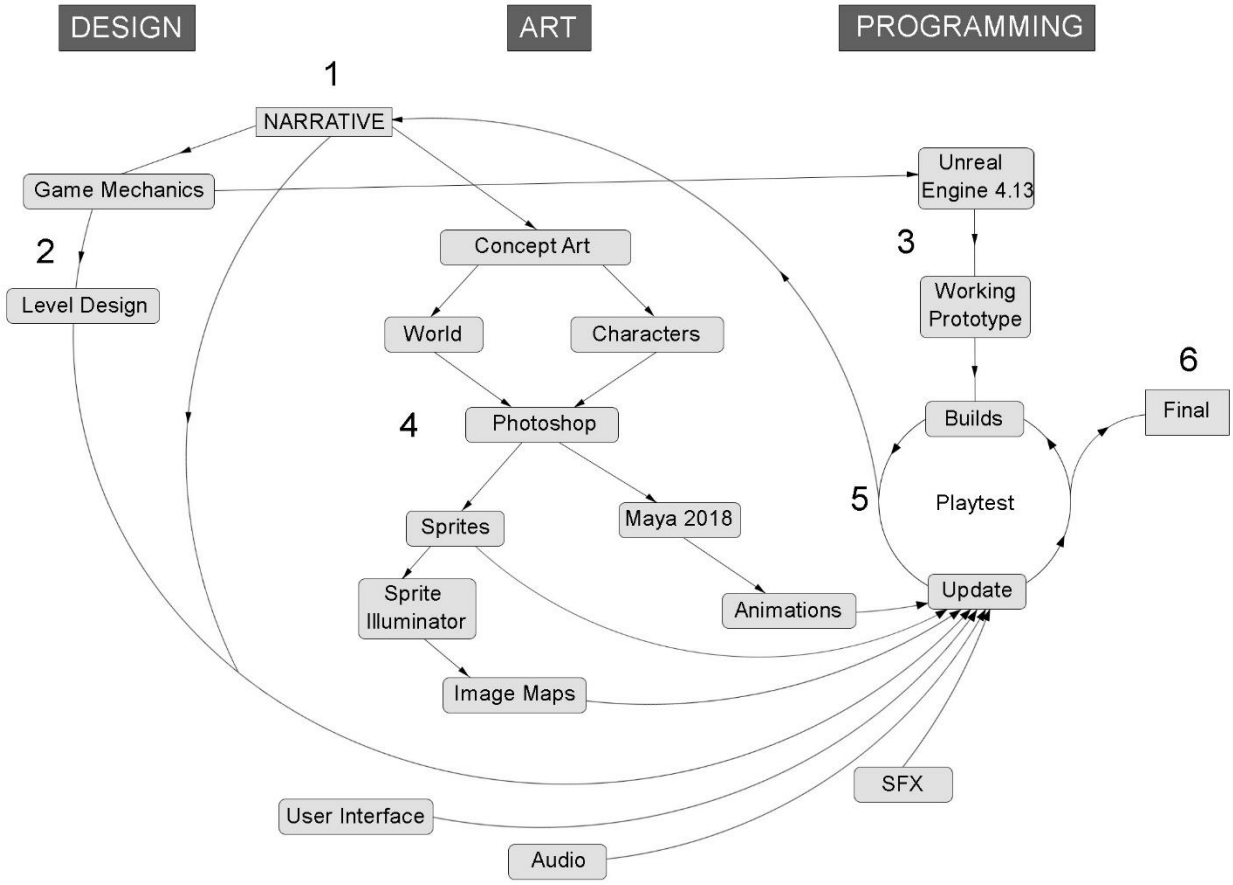

Figure 11. The development pipeline for *Sun of the Children.* This figure depicts the workflow of this project and the major software used in each phase.

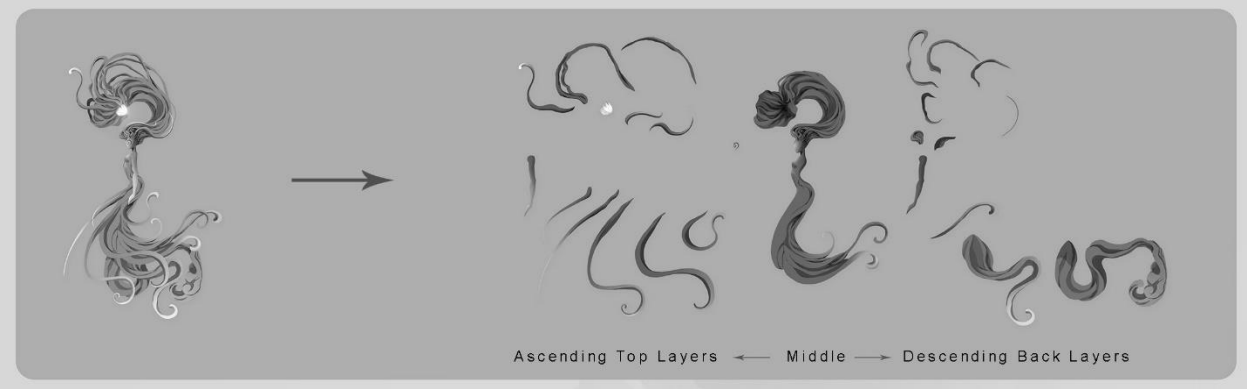

Figure 12. Character layers for animation. Each part of the character is separated into layers for animation. The order of these layers in the z-direction is crucial to avoid character distortion, i.e. both arms appearing behind the body.

Playtesting

Playtesters were observed by the author, typically two at a time. The author took notes while watching the gameplay session, recording player actions, comments or questions (Figure 13). Conversation between the author and the playtester was withheld until the end of the session. There were two benchmark playtesting sessions with students and faculty; peers were also engaged for less formal, incremental feedback throughout the process. The goals of the first playtesting session were:

- Did players understand what to do?
- Did players understand the narrative of the game?
- Did players understand the motivations of the characters and who/what they are?

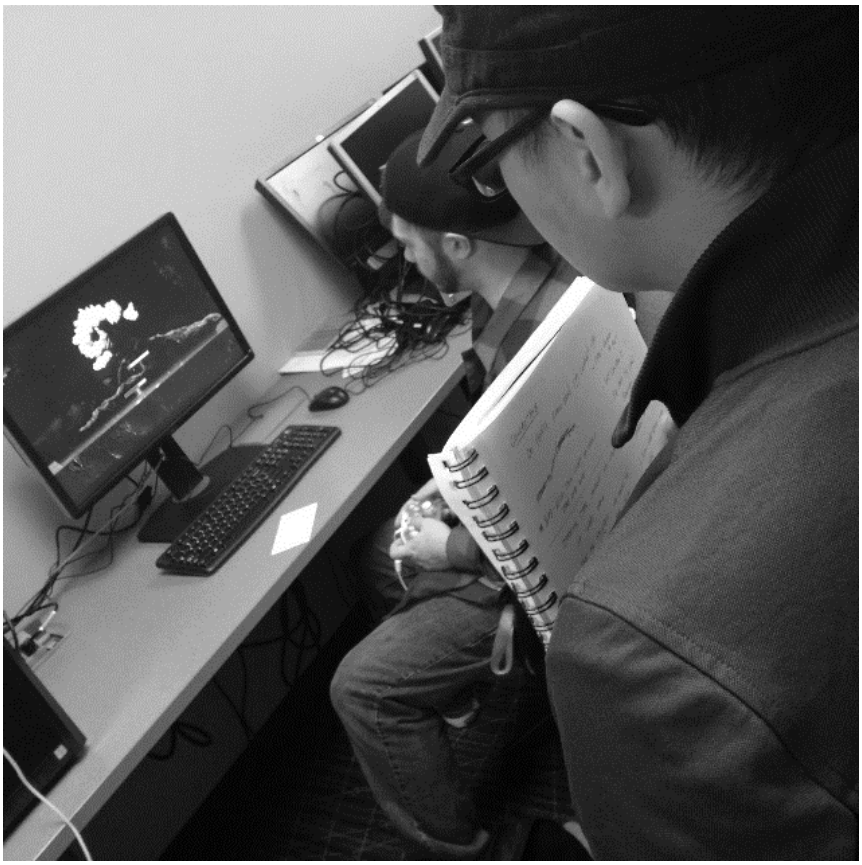

Figure 13. Playtesting while observed by the author. Observational player experience is noted in the first mass playtest at the Game Design and Development Lab in Jarvis Hall, November 9, 2017

The answers to these questions were an overwhelming no. During the first mass playtest, there was no UI indicating controls. This was done purposely to observe the extent of player curiosity, player expectations and instincts. *Sun of the Children* requires the use of both analog sticks to move the characters. Moving Stardust Boy made sense to players because he was controlled using the left stick which is universally used for digital game character movement. Once Grasshair Girl appeared underwater, no one attempted to move her with the right analog stick until revealed by the author. In fact, some players felt she was an enemy and stayed away

from her. This was due to her dark green, squid like form. No one recognized it had a human figure until they controlled her.

Part of the design of this game was to limit UI as much as possible and focus only on the artwork to indicate information. For example, a characters' brightness will diminish if they are weak. But this heavily distracted the player's experience in learning the game and steered their attention away from the narrative. The key takeaway from this playtest was to add button prompts so players will understand what to do and to modify the lighting and color of Grasshair Girl into a less menacing figure.

In preparation for the second mass playtest, adjustments were made. The button prompts for a tutorial area were created. More art assets were placed in as well as lighting and animation states which helped direct the narrative. For this playtest, these questions were added:

- How were the quality of the character movements?
- How was the pacing of the game?

In this early build, the game design required the boy to constantly replenish the girl with light or else she will die. In return, the girl will grow trees to create fruits absorbed by the boy to keep him alive. This co-dependent system on paper seemed fine. But as playtests went on, it became a chore for players to constantly stop exploring/moving and replenish the life of the other character. It ruined the pacing of the game and was ultimately removed. The character's life has no decay. This allowed for exploration and the adjusting to the simultaneous gameplay. Many players enjoyed the art and felt the life decay got in the way of the paidic experience.

The character movements had no complaints from the players, but it was the button mapping that was confusing, especially the jump for the Stardust Boy. The most common button for jumping are the face buttons, usually the 'A' or 'B' button. Because of the design of this

game, none of the face buttons are used. For this playtest, the jump button was mapped onto the Left Trigger button. Most players thought this was awkward and preferred the jump button be placed elsewhere. Throughout playtesting, the jump button was mapped onto the LB button, the Up directional button, the Up analog and the L3 button (pressing down on the analog stick). The L3 button was the choice most were comfortable with.

The smaller playtesting that took place caught a lot of game breaking bugs. Most of these bugs were related to camera movement which will affect narration. This game doesn't make use of a start screen which usually includes a 'Press Start to Play' button. Instead, the game begins similar to contemporary films, delaying the credits to the end of the movie to expedite immersion. This was one of the more challenging parts as most narrative games will use a cinematic to introduce the world, scenario, characters and their motivations. The initial idea was to have a light orb, controlled by the player, collect several particles from the sun. When enough were collected, the orb blossoms into Stardust Boy. After confusion from players the orb was changed into a bird. Having a form that represents peace, love and longing will act as a better narrative device. A second bird was later added to introduce to players the simultaneous control scheme and foreshadow that there are two characters in the game. Two birds also will help with the narrative of the 'soulmate', indicating the relationship of Stardust Boy and Grasshair Girl.

The game at its current state is still under development and requires more playtesting if production continues. Areas of focus for playtesting will be the evolution of the game and ludonarrative mechanics through each Act. The success of these mechanics is crucial in developing the characters.

Chapter V: Conclusions and Implications

The current foundation for this project is a solid start to inform the remaining game design and to learn more about player intuition and understanding. Development will continue on Acts Two and Three.

Conclusions of the Project

Figure 14. Stout Game Expo, fall 2017. Students and parents playing *Sun of the Children.*

It is hard to judge the impact of these devices as some of them were only theorized but what the project currently has completed shows that audiences are interested. The game was showcased at the Stout Game Expo (SGX) Fall 2017 (Figure 14), receiving positive support for future and further development of the game. It won Best Independent Game at SGX (Figure 15).

Figure 15. Sun of the Children-Best Independent Game at SGX 2017. Chuewa Vang, left, and Hue Vang, right.

Next steps will address the use of dynamic music, which require more advanced developer knowledge. Technical art will also be a target for improvement by learning the appropriate skills or contracting experts in the field. Designing features such as haptic feedback and audio cues can support inclusivity for players, non-players and players with disabilities.

Further game design and character design will be created for the 2nd and 3rd Acts. The main focus will be on using game mechanics as storytelling devices and continued playtesting. A publication of the proof of concept will be available through the online game platform Steam in spring 2018.

Figure 16. Sun of the Children thesis exhibition opening. University of WI-Stout, December 6, 2017.

Figure 17. Sun of the Children wins People's Choice Award at M+DEV Conference. Madison, WI. 2017.

Implications for the Field of Game Design

Using game mechanics as storytelling devices has potential for innovative narrative experiences. Cinematic cutscenes may be effective in establishing plot or character motivation within the game, but this structure disrupts player experience by alternating modes of immersion, thus weakening the impact of both game and story. Learning how to play a game is like learning a new language; this takes effort and may not appeal to some audiences. If digital games are to borrow narrative ideas from other domains, borrow their disruptions and innovations, not their formulas.

Figure 18. In-game screen capture of *Sun of the Children*. Stardust Boy and Grasshair Girl interact by the log.

Ludonarrative design, in its current state, invites negative reaction from players and developers because of the story and game dissonance present in mainstream digital games. Further exploration and implementation of ludonarrative design is needed to counter those reactions. *Sun of the Children* sparked interest and curiosity from playtesters. Being recognized as *Best Independent Game* at SGX Fall 2017 is an endorsement of this direction for implementation of ludonarrative mechanics. These mechanics focus on the 'feel' of an action,

idea or emotion rather than the ‘look’. They are analogous to cinematography’s role in filmmaking: enhancing the ‘feel’ of the script by using various camera angles, lenses, and light sources. It requires specialization to understand and successfully implement the technical art of the cinematographer and the same should be said for a ludonarrative designer; it should be a discrete discipline within the field of game design. Their role within the field should be the design of resonance, not dissonance, between story and game. Complex, psychological narratives and character studies in digital games can only move forward if ludonarrative mechanics are more fully explored. These designers are visual poets, interpreting the most effective way to express narrative themes, character motivation, traits, emotions, morals and ethics.

There are many unanswered questions for this practice yet to be explored, such as its effectiveness for contemporary narratives, educational games, and the VR/AR forefront. As games and interactive media are increasingly implemented in our daily lives and across myriad disciplines, it is an exciting, and pivotal, time to study and create ludonarrative games.

References

2K Games, Inc. (2007). BioShock [Computer software]. Novato, CA: 2K Games.

Activision Publishing, Inc. (1977). Zork [Computer software]. United States: VisiCorp.

Atari, SA. (1972). Pong [Computer software]. Sunnyvale, CA: Atari.

Ballesteros, S., Prieto, A., Mayas, J., Toril, P., Pita, C., Ponce de León, L., … Waterworth, J. (2014). Brain training with non-action video games enhances aspects of cognition in older adults: a randomized controlled trial. *Frontiers in Aging Neuroscience, 6,* 277. http://doi.org/10.3389/fnagi.2014.00277

Beauregard, G. (Producer), & Godard, J. (Director). (1961). *Breathless* [Motion Picture]. France: UGC.

Bender, L. (Producer), & Tarantino, Q. (Director). (1994). *Pulp fiction* [Motion Picture]. United States: Miramax.

Bluth, D., & Dyer, R. (1983). Dragon's lair [Computer software]. EL Cajon, CA: Cinematronics.

Bucher, J. (2018). *Storytelling for virtual reality: Methods and principles for crafting immersive narratives.* New York, NY: Routledge.

Bullough, E. (1912). 'Psychical distance' as a factor in art and as an aesthetic principle. *British Journal of Psychology, 5,* 87-117.

Caillois, R. (1961). *Man, play and games.* (M. Barash, Trans.). New York, NY: The Free Press.

Caruso, N. (2011, March 24). *The video game crash of 1983*. Retrieved from http://thegaminghistorian.com/the-gaming-historian-the-video-game-crash-of-1983/

Casual Games Association. (2013). *Smartphone & tablet gaming 2013* [Pamphlet]. Retrieved from http://cdn2.hubspot.net/hubfs/700740/CGA-Smartphones-and-Tablets 2013-Games-Market-SectorReport_V1.pdf?t=1455184131353

Crowther, W. (1976). Colossal cave adventure [Computer software]. Stanford, CA: Stanford Artificial Intelligence Laboratory.

Disney, W. (Producer), & Hand, D. (Director). (1938). *Snow white and the seven dwarfs* [Motion Picture]. United States: RKO Radio Pictures.

Entertainment Software Association [ESA]. (2016). *2016 sales, demographic, and usage data: Essential facts about the computer and video game industry* [Pamphlet]. Retrieved from http://www.theesa.com/wp-content/uploads/2016/04/Essential-Facts-2016.pdf

ESA. (2017). *2017 sales, demographic, and usage data: Essential facts about the computer and video game industry* [Pamphlet]. Retrieved from http://www.theesa.com/wp-content/uploads/2017/04/EF2017_FinalDigital.pdf

[ETC Show]. (2016, Oct 30). *Nolan Bushnell: The father of video games - etc podcast.* [Video File]. Retrieved from https://www.youtube.com/watch?v=9absxc27XPY

Herrmann, D., & Felfe, J. (2014). Effects of leadership style, creativity technique and personal initiative on employee creativity. *British Journal of Management*, *25*, 209-227.

Hocking, C. (2007, Oct 7). *Ludonarrative dissonance in Bioshock: The problem of what the game is about.* [blog post]. Retrieved from http://clicknothing.typepad.com/click_nothing/2007/10/ludonarrative-d.html

Jensen, G. H. (2013). Making sense of play in video games: Ludus, paidia, and possibility spaces. *Eludamos: Journal for Computer Game Culture*, *7*(1), 69-80. Retrieved from http://www.eludamos.org/index.php/eludamos/article/view/vol7no1-4/7-1-4-html

Juul, J. (2001, July). *Games telling stories? -A brief note on games and narratives.* Retrieved from http://www.gamestudies.org/0101/juul-gts/#1

Juul, J. (2005). *Half-real. Video games between real rules and fictional worlds*. Cambridge, MA: The MIT Press.

Kanaga, D. & Key, E. (2013). Proteus [Computer software]. London, UK: Curve Digital.

Hartmann, T. & Klimmt, C. (2006). Effectance, self-efficacy, and the motivation to play video games. In J. Bryant & P. Vorderer (Eds.), *Playing video games: Motives, responses, and consequences* (pp. 132-145). Abingdon, U.K.: Routledge.

Koei Tecmo Holdings Co., Ltd. (1988). Ninja gaiden [Computer software]. Tokyo, Japan: Tecmo.

Koster, R. (2005*). A theory of fun for game design.* Scottsdale, AZ: Paraglyph Press.

Kurtz, G. (Producer), & Lucas, G. (Director). (1977). *Star wars* [Motion Picture]. United States: 20th Century Fox.

LucasArts Entertainment Company, LLC. (1991). Monkey island 2: LeChuck's revenge [Computer software]. San Francisco, CA: LucasArts.

Ludology. (2018). In *Oxford dictionaries.* Retrieved from https://en.oxforddictionaries.com/definition/ludology

Moore's Law. (n.d.). *Moore's law.* Retrieved from http://www.mooreslaw.org/

Namco Limited. (1980). Pac-man [Computer software]. Tokyo, Japan: Namco.

Namco Limited. (1981). Ms. pac man [Computer software]. Tokyo, Japan: Namco.

Narrativity. (2017). In *Oxford dictionaries.* Retrieved from https://en.oxforddictionaries.com/definition/narrativity

Narratology. (2017). In *Oxford dictionaries.* Retrieved from https://en.oxforddictionaries.com/definition/narratology

Naughty Dog, LLC. (2016). Uncharted 4: A thief's end [PlayStation 4 software]. Tokyo, Japan: Sony Interactive Entertainment.

Nintendo Co., Ltd. (1985). Mario bros. [Computer software]. Kyoto, Japan: Nintendo.

Parker, L. (2011, February 17). *The rise of the indie developer: Will the golden age last?* Retrieved from https://www.gamespot.com/articles/the-rise-of-the-indie-developer/1100-6298425/

Playdead ApS. (2010). Limbo [Computer software]. Copenhagen, Denmark: Playdead.

Playdead ApS. (2016). Inside [Computer software]. Copenhagen, Denmark: Playdead.

Poe, M. (2011). *A history of communications: Media and society from the evolution of speech to the internet.* New York, NY: Cambridge University Press.

Rohrer, J. (2007). Passage [Online application]. United States: Jason Rohrer.

Russell, S. (1962). Spacewar! [Computer software]. United States: Steve Russell.

Schultz, W. (2017, March 17). *Aaa game*. Retrieved from https://www.thoughtco.com/what-is-aaa-game-1393920

Sigl, R. (2013, September 11). *Games are architectures for an emotional experience - An interview with Dan Pinchbeck.* Retrieved from http://videogametourism.at/content/games-arearchitectures-emotional-experience-interview-dan-pinchbeck

Snow, B. (2011, August 17). *Why most people don't finish video games.* Retrieved from http://edition.cnn.com/2011/TECH/gaming.gadgets/08/17/finishing.videogames.snow/

Spence, I., & Feng, J. (2010). Video games and spatial cognition. *Review of General Psychology*, *14*(2), 92-104.

Square Enix Holdings Co., Ltd. (1987). Final fantasy [Computer software]. Tokyo, Japan: Squaresoft.

Suellentrop, C. (2016, May 24). *'Uncharted 4' director Neil Druckmann on Nathan Drake, sexism in games: Naughty dog creative director talks about reading NeoGAF forums, confronting sexist focus testers and thinking of Nathan Drake as a game developer.* Retrieved from https://www.rollingstone.com/culture/news/uncharted-4-director-neil-druckmann-on-nathan-drake-sexism-in-games-20160524

Taito Corporation. (1978). Space invaders [Computer software]. Tokyo, Japan: Taito.

Takahashi, D. (2013, February 8*). An interview with Jenova Chen: How Journey's creator went bankrupt and won game of the year.* Retrieved from https://venturebeat.com/2013/02/08/an-interview-with-jenova-chen-how-journeys-creator-went-bankrupt-and-won-game-of-the-year/view-all/

Thatgamecompany, LLC. (2006). Flow [Computer software]. Tokyo, Japan: Sony Interactive Entertainment.

Thatgamecompany, LLC. (2009). Flower [Computer software]. Tokyo, Japan: Sony Interactive Entertainment.

Thatgamecompany, LLC. (2012). Journey [Computer software]. Tokyo, Japan: Sony Interactive Entertainment.

The Chinese Room Ltd. (2012). Dear esther [Computer software]. Brighton, UK: The Chinese Room.

Université de Genève. (2017, December 12). *Action games expand the brain's cognitive abilities*. Retrieved from https://www.unige.ch/communication/communiques/en/2017/cdp051217/

[VentureBeat]. (2011, Jan 11). *Steve Russell talks about his early video game Spacewar* [Video File]. Retrieved from https://www.youtube.com/watch?v=PnJvZHegg8I

[Walker Art Center]. (2009, July 21). *Chance conversations: An interview with Merce Cunningham and John Cage* [Video File]. Retrieved from https://www.youtube.com/watch?v=ZNGpjXZovgk

Welles, O. (Producer), & Welles, O. (Director). (1941). *Citizen Kane* [Motion Picture]. United States: RKO Radio Pictures.

Williams, A. (2017). *History of digital games: Developments in art, design and interaction.* Boca Raton, FL: CRC Press.

[World of Longplays]. (2011, Jan 5). *Pc longplay [114] Monkey Island 2 special edition: Lechuck's revenge.* [Video File]. Retrieved from https://www.youtube.com/watch?v=AerjOGn6jGo

Wright. W. (2006, April 1). *Dream machines.* Retrieved from https://www.wired.com/2006/04/wright-2/