The Narrative Potential of Videogames:
How Designing Mechanics Impacts Storytelling

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Abstract

This research started with the development of four preliminary videogame prototypes, these prototypes were then reflected on and synthesized into four key points used to direct the development of a final prototype focused on generating narrative play through game mechanics. This research used an action research methodology, each prototype representing one complete cycle of action research. The prototypes use an experimental game design method, and critical reflection to iterate on the design of the narrative game mechanics.

The research presents a four-step approach for developing narrative play in videogames through game mechanics and shows how it has been applied to the final game prototype, it is a first step towards developing a framework for new narratives in videogames. Narrative play can potentially be manifested in the player's mind through mechanics when a clear story structure is present. Manipulating the game's mechanics to present situations as story beats can provide structure to narrative play.

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Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgments), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

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Introduction

Videogame stories are often described in terms of other mediums and narrative techniques,[1] such as dialogue, cinematics, and exposition. It is more common for players to think of cutscenes, which interrupt play to present a short movie, or walls of expository text which similarly interrupts play, than to think of gameplay as the story telling technique.[2] What makes a game unique is its approach to gameplay. Unlike other mediums, games cannot exist without a player playing them.[3] The story of a book will still be there, whether it is read now or later; a movie will continue playing, regardless of whether an audience member leaves halfway through, but a game will stop functioning if you turn it off. How then, can gameplay be used to tell stories? 'Emergent narratives'[4] is one technique with which to accomplish this. This concept refers to narratives that can emerge from gameplay while the player plays the game. However, emergent narratives cannot tell complete stories; rather, they represent moments of interesting gameplay that are unique to each player.[5] The question thus arises: how can game designers author stories for games that can be experienced by multiple and different players?

Using gameplay to tell stories is an underexplored area of game studies.[6] Narrative game mechanics[7] may hold the potential to tell stories within games that have to date not been utilised. To begin exploring this area, experimental game prototypes[8] can be used. Games such as *Papers, Please*,[9] *Brothers: A Tale of Two Sons*,[10] and *Ico*[11] have successfully utilised game mechanics to tell stories. However, a common and unified approach that game designers can use to replicate this must be developed. This research seeks to initiate this development.

Research Question

If games currently borrow most of their storytelling techniques from other mediums, how can we know the true narrative potential of videogames as a medium? Through the design of game mechanics and prototyping, this thesis considers the narrative potential of videogames, with the aim of providing game designers the opportunity for deeper narrative enquiry into videogames.

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[1] Colleen Macklin and John Sharp, *Games, Design and Play: A Detailed Approach to Iterative Game Design*, 1 edition. (Addison-Wesley Professional, 2016)., 4.

[2] Anna Anthropy and Naomi Clark, *A Game Design Vocabulary: Exploring the Foundational Principles Behind Good Game Design*, 1 edition. (Upper Saddle River, NJ: Addison-Wesley Professional, 2014)., 8.

[3] Macklin and Sharp, *Games, Design and Play*., 4.

[4] Katie Salen and Eric Zimmerman, *Rules of Play : Game Design Fundamentals* (MIT Press, 2003)., 377.

[5] "The Problem with Emergent Stories in Video Games," *PopMatters*, last modified July 30, 2013, accessed May 23, 2019, https://www.popmatters.com/173580-the-problem-with-emergent-stories-in-video-games-2495740343.html.

[6] Teun Dubbelman, "Narrative Game Mechanics," in *Interactive Storytelling*, ed. Frank Nack and Andrew S. Gordon, vol. 10045 (Cham: Springer International Publishing, 2016), 39–50, accessed October 26, 2018, http://link.springer.com/10.1007/978-3-319-48279-8_4., 49.

[7] Ibid., 39.

[8] Annika Waern and Jon Back, eds., *Experimentail Game Design* (Pittsburgh, PA: lulu.com, 2015)., in Ibid., 341.

[9] Lucas Pope, *Papers, Please* (3909, 2013).

[10] Starbreeze Studios AB, *Brothers: A Tale of Two Sons* (505 Games, 2013).

[11] Fumito Ueda, *Ico* (Team Ico, Sony Interactive Entertainment, SIE Japan Studio, 2001).

Overview of Research

The following section discusses the existing literature, starting with a clear approach to the language of game design, as it is employed throughout this research. Following on, definitions of aspects included in this thesis such as 'game mechanics', 'narrative', 'story' 'player agenda' and 'player attention' are defined. Finally, narrative play, expressive play, and narrative game mechanics are discussed. The subsequent section outlines the methodological approach adopted in this research, known as action research. Then, the three main methods of game design, experimental game design, prototyping, and critical reflection, are presented. A discussion section then follows presenting the development and findings from the first four game prototypes produced for the current research. These findings are then fused into an approach for designing the final game prototype, *Beacons to Oceans*. This prototype is subsequently discussed, prior to synthesising the final ideas of this thesis.

Literature Review

This literature review addresses the language of game design used by designers and game academics: narrative, and story and play, and highlights narrative game mechanics as an area of exploration for the present research.

Game studies is still a relatively young academic field, with researchers spending a significant amount of time justifying why studying games is important. [12] Based on this need for the justification of game studies, a broad scope of language is applied when discussing games. This makes it difficult to talk about games, as the vocabulary applied when doing so readily changes. Additionally, a number of terms can have multiple different meanings, for example, 'narrative play'. Therefore, before we can begin exploring how we can tell stories through game mechanics, we must first gain a clear approach to the language used for doing so, and a detailed understanding of the aspects involved.

The second half of this literature review reviews the topics of expressive play and narrative game mechanics in terms of what they are, and how they function. Additionally, several examples of narrative game mechanics implemented in current games are presented.

The Language of Game Design

The field of game design has for some time lacked a cohesive language for talking *about* games. This lack of vocabulary has made it difficult for designers to discuss and share ideas. Many of the terms game designers use were derived from marketing, or formulated by public relations agencies in a bid to sell games, as opposed to discussing them.[13] Presently, texts are available on the vocabulary of games, and academics are actively creating critical languages[14] for discussing games. The issue with these languages is that they are aimed at the analysis of games in an academic context, and not particularly relevant to designers creating games.

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[12] Gonzalo Frasca, "Ludologists Love Stories, Too: Notes from a Debate That Never Took Place" (n.d.): 8.
[13] Anthropy and Clark, *A Game Design Vocabulary*., 6.
[14] Costikyan Greg, "I Have No Words & I Must Design: Toward a Critical Vocabulary for Games" (2002).

Game, Design and Play[15] (2017) by Colleen Macklin and John Sharp takes its influence from other influential game design books published previously.[16] However, *Game, Design and Play* shapes a language focused on the practical application of designing games, rather than focusing on 'games' and 'play' as high-level abstract concepts. For the current research, it is important that practical language be employed, as this study is aimed at designers, not academics.

Macklin and Sharp[17] provide six basic elements of play that can be used as the basic building blocks of play. These are as follows: **Action** represents the player's abilities within the game. **Goals** are what the player wishes to achieve. **Rules** are the limitations the game imparts on the player. **Objects** represent anything the player can interact with within the game. **Playspace** is the available area of play. **Players** refer to the person or agents playing the game.

Macklin and Sharp[18] also provide ten different forms of play. These are not the only forms of play available, but simply those most commonly found in video games. The most notable for narrative games is 'expressive play', which suppresses player choice in favour of sharing an aspect of the human experience.

Game Mechanics

Numerous definitions have been formulated for describing what game mechanics are. Miguel Sicart[19] considered multiple definitions formulated by academics such as Aki Järvinen[20], and papers that address topics such as the MDA framework[21], and found that their definitions do not fully encapsulate the nature of games. Sicart therefore proposes a new definition: "Game mechanics are methods invoked by agents, designed for interaction with the game state". He goes on to state that a singular game mechanic is "the action invoked by an agent to interact with the game world, as constrained by the rules".[22]

This definition allows us to understand game mechanics within the context of the six basic elements of play. Accordingly, **game mechanics are the player's actions within the playspace, constrained by the rules.**

Narrative and Story

Narrative encompasses as many, if not more, definitions as do 'game mechanics'. A common and traditional definition states that narrative presents a story, which is defined by linearity, chronology,

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[15] Macklin and Sharp, *Games, Design and Play*.
[16] Tracy Fullerton, Christopher Swain, and Steven Hoffman, *Game Design Workshop : A Playcentric Approach to Creating Innovative Games*, Second edition. (Elsevier Morgan Kaufmann, 2008)., Salen and Zimmerman, *Rules of Play*., Anthropy and Clark, *A Game Design Vocabulary*.
[17] Macklin and Sharp, *Games, Design and Play*., 4 – 14.
[18] Ibid., 48 – 76.
[19] Miguel Sicart, "Defining Game Mechanics," *Game Studies* 8, no. 2 (December 2008), accessed June 5, 2019, http://gamestudies.org/0802/articles/sicart.
[20] Aki Järvinen, *Games without Frontiers : Methods for Game Studies and Design*, 2009.
[21] Robin Hunicke, Marc LeBlanc, and Robert Zubek, "MDA: A Formal Approach to Game Design and Game Research" (n.d.): 5.
[22] Sicart, "Defining Game Mechanics."

and events proceeding successively. [23] The reason why 'game' is defined differently from 'narrative' is because the latter recounts actions, while the former presents actions carried out by the player.[24] However, this definition only remains true if we hold to the traditional definition of 'narrative'.[25] Alternatively, 'cognitive narratology' [26] can be employed to understand how narratives function in games. Teun, paraphrasing Ryan, states that "stories do not essentially reside within the narrative text but…within the human mind as a mental construct."[27] Accordingly, stories are constructed in the reader's mind as a response to narrative texts.[28]

Neitzel defines 'stories' as an act of narration.[29] Each story represents one instance, or telling of the narration. Therefore, in the case of games, if the story resides in the mind of the player, it can be argued that story is "the process of systematically creating new constraints in the minds of the audience." [30] These constraints can influence the story, or the way in which the game mechanics are observed.

This research investigates how narratives manifest through game mechanics. This study employs the story structure presented in the book *Save the Cat*[31] as a means for elucidating the process involved in writing stories. Story structure employs 'story beats' as important markers that must be implemented when writing a story. Evidence exists in game literature that addresses the concept of story beats[32] and expands on it; therefore, the story structure of the above-noted book was adopted as a foundation for story writing in this research.

Player Agenda and Attention

Two concepts should be considered when thinking about how players approach and play games. The first of these is the **'gamist agenda'.**[33] This notion refers to a player playing a game according to a gamist agenda, that is, with the aim of achieving the goals of the game in the best way possible. One way of doing this is by 'gaming the system' [34] also known as 'min/maxing' [35], which refers to minimising actions to achieve maximum benefits. Players will often ignore stories, characters, and context when using this approach, which becomes problematic in the context of narrative games. The second

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[23] Gérard Genette, *Narrative Discourse : An Essay in Method* (Cornell University Press, 1980)., David Bordwell, *Narration in the Fiction Film* (Madison, Wis. : University of Wisconsin Press, 1985., 1985).

[24] "Narrativity of Computer Games | the Living Handbook of Narratology," accessed September 18, 2018, http://www.lhn.uni-hamburg.de/article/narrativity-computer-games., "Narrative across Media : The Languages of Storytelling: Live.", 9.

[25] Marie-Laure Ryan, *Avatars of Story* (Minneapolis, UNITED STATES: University of Minnesota Press, 2006).

[26] Alexander D. King, "Story Logic: Problems and Possibilities of Narrative David Herman," *Journal of Linguistic Anthropology* 14, no. 2 (2004): 297., David Bordwell, *Narration in the Fiction Film*.

[27] Dubbelman, "Narrative Game Mechanics.", 40.

[28] "Narrative across Media : The Languages of Storytelling: Live.", 9.

[29] "Narrativity of Computer Games | the Living Handbook of Narratology."

[30] Brian Upton, *The Aesthetic of Play* (Cambridge, Mass: The MIT Press, 2015)., 271.

[31] Blake Snyder, *Save the Cat! : The Last Book on Screenwriting You'll Ever Need* (M. Wiese Productions, 2005)., 70.

[32] Brian Upton, *Situational Game Design* (Milton, UK: CRC Press LLC, 2017)., 92.

[33] Upton, *The Aesthetic of Play*., 195.

[34] Sarah Thorne, "Gaming the System: Affect, Agency, and Communicative Capitalism" (n.d.): 3.

[35] Soren Johnson, "GD Column 17: Water Finds a Crack," *DESIGNER NOTES*, June 13, 2011, accessed September 12, 2018, https://www.designer-notes.com/?p=369.

concept to consider is the player's 'attention' [36] while playing a game. **'Reflexive attention'** refers to any aspect that draws the player's attention, while **'executive attention'** refer to elements that require the player's voluntary attention.

When considering the use of mechanics to tell stories, the argument can be made that mechanics can undermine narrative if they promote the gamist agenda. There are good examples of games using the gamist agenda as a narrative device. For example, *Papers*, *Please* [37] requires the player, acting as an immigration officer, to focus on repetitive working style tasks as a means of engaging in the repressive experience of a fictional dystopian Eastern European government. *Papers*, *Please* achieves this by requiring executive attention during the main game loop, while subverting the gamist agenda inherent in simulation games.

Not all players seek out the same style of play in games. Competitive play and challenge-based play promote the use of the gamist agenda by requiring reflexive attention. Expressive play and narrative play can employ reflexive attention for effect; however, to tell stories, it is important to employ executive attention, which will enable the player to engage with the story at their own pace.

Narrative Play

'Narrative play' has two definitions in game studies. First, Katie Salen and Eric Zimmerman's *Rules of Play*[38] defines narrative play as a means for understanding how games construct narrative experiences. The authors state that games have either embedded or emergent narrative structures, or employ a combination of the two. Second, Brian Upton's *The Aesthetic of Play*[39] defines narrative play as a method of play that arises when engaging with story. As story beats are presented to the player, they process the information they already have about the story, and interpret potential directions in which the story may develop. On encountering subsequent beats, these potential directions are either confirmed or denied. The goal of narrative play is not defined as 'winning', but rather, as 'narrative closure',[40] and allows for a variety of interpretations, derived from different players. For example, halfway through the game *Journey*[41], the player encounters giant flying monsters called 'Guardians', which will attack the player. Prior to this point in the game, the player has encountered no enemies or danger in the game; their main goal has been one of exploration and progression. This new threat serves as a story beat that creates potential narratives about what *may* happen. Can the player die? Will they need to defeat these Guardians? These new possibilities can change how the player observes and plays the game in a bid to find answers to these new questions, which will subsequently provide narrative closure.

Narrative play takes time,[42] which is why games that require significant reflexive attention, and do not often allow the player moments of respite during gameplay, is not a preferred approach for narrative play. Players require space and time to consider the potential outcomes of a narrative.

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[36] *Making Your Games Better with Psychology and Playtesting, the Uncharted Way*, n.d., accessed September 15, 2019, https://www.youtube.com/watch?v=TW7T9s1nYiU.

[37] Lucas Pope, *Papers, Please*.

[38] Salen and Zimmerman, *Rules of Play*.

[39] Upton, *The Aesthetic* of *Play*., 215.

[40] Ibid., 195.

[41] That Game Company, *Journey* (Sony Interactive Entertainment, Annapurna Interactive, 2012).

[42] Upton, *The Aesthetic of Play*., 281.

Upton's definition of narrative allows the player to explore game narratives in a manner not allowed for by Salen and Zimmerman's definition. Emergent narratives arise from play, but require the player to take on the role of story author.[43] Embedded narratives are traditional stories told through exposition; exposition, however, can be tedious.[44] In a game context, the maxim 'show don't tell' can refer to gameplay, not exposition. Expressive play does not exist in Salen and Zimmerman's definitions of narrative play; nonetheless, the concept allows ways for game designers to explore telling stories through gameplay, not exposition.

Expressive Play

There are two ways in which to engage with expressive play: through player expression and authorial expression. 'Player expression' is a type of play through which the player can freely express themselves, as is the case in *Minecraft*,[45] where the player can create their own world with other players. In Minecraft, players are free to express themselves however they please; the game provides a space in which they can tell stories, together with their friends. In this instance, it can be argued that 'player expression' represents the 'player as author'. 'Authorial expression' in the current context refers to a type of play where the game designer can freely express themselves, as in the game *Passage*.[46] *Passage* is a short game in which the player moves only left or right on a two-dimensional plane. As they move right, time passes; they start the game as a young player, meets someone, get married, and eventually die. The game clearly expresses its message: life, from beginning to end. Thus, authorial expression can be argued as representing the game designer as author. The current research is interested in the notion of authorial expression, and the methods through which game designers can author game mechanics to create narratives that give rise to stories in the player's mind.

Narrative Game Mechanics

This thesis has discussed game mechanics used for crafting stories, a notion expanded in Teun Dubbelman's paper "Narrative Game Mechanics", in which he states, "Narrative Game Mechanics invite agents, including the player, to perform actions that support the construction of engaging stories and fictional worlds in the embodied mind of the player".[47] In the game *Ico*,[48] for example, a significant part of solving puzzles relates to escorting a girl through the game environment. The player must hold the girl's hand and lead her through the puzzles, and call out to her when she becomes lost. The relationship between these two characters is not established using exposition, but through gameplay. Through the execution of actions, the player learns who these two characters are, and what they mean to each other.[49] In *Brothers: A Tale of Two Sons*[50], each 'brother' within the game is controlled by a different joystick on one dual stick controller. Both brothers are required to solve the puzzles within the game, and each have different strengths and weaknesses for doing so. Towards the end of the game, the older brother dies, leaving the younger brother to return home alone. This

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[43] "The Problem with Emergent Stories in Video Games."
[44] Upton, *The Aesthetic of Play*., 279.
[45] Markus Persons, *Minecraft* (Mojang, 2009).
[46] Jason Rohrer, *Passage* (Jason Rohrer, 2007).
[47] Dubbelman, "Narrative Game Mechanics.", 49.
[48] Ueda, *Ico*.
[49] Upton, *The Aesthetic of Play*., 268.
[50] Starbreeze Studios AB, *Brothers: A Tale of Two Sons*.

change in game mechanics imbues the older brother's death with an emotional impact.[51] In *Papers, Please*,[52] players are incentivised to 'work hard and obey the rules', as doing so earns them money, which they can use to keep their family fed, healthy, and warm. As the game adds more rules to follow each day, and with every mistake made by the player being penalised, it becomes more difficult to earn enough money to support their family. The player is incentivised to break the rules and to accept bribes in order to keep their in-game family alive. There are many other ways in which the game uses rules and mechanics to create interesting narrative situations. "In short, the driving force behind the development of the story in *Papers, Please* are the mechanics and rules".[53]

Dubbelman employs narrative game mechanics as an analysis tool, subsequently relating it to 'game design patterns'.[54]. His use of game design patterns for analysing *Papers, Please* illustrates how narrative game mechanics and rules can be used to create engaging story events for the player. Game design patterns are "Patterns of commonly reoccurring parts of the design of a game that concern gameplay".[55] However, game design patterns are aimed at the *analysis* of games, not at *designing* games. For the practical application of designing and making games, the definition of game mechanics adopted herein, and the rules that define the games playspace in conjunction with narrative game mechanics can be used. Accordingly, **narrative game mechanics are the player's actions within the playspace, constrained by the rules of said space, that support the construction of engaging stories and worlds within the embodied mind of the player.**

Narrative play can be used as a bridge between the mechanics and construction of stories. Through this link, a game can be presented that encompasses expressive play, and tells engaging stories.

Narrative game mechanics is an "under-discussed topic"[56] in game design, and Dubbelman recommends further research into this field. Additional research and case studies will be useful for the analysis of games and its context within academia. However, for the practical application of game design, narrative game mechanics can be employed to formulate an approach that other game designers can use to author stories within games.

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[51] Yuin Theng Sim and Alex Mitchell, "Wordless Games: Gameplay as Narrative Technique," in *Interactive Storytelling*, Lecture Notes in Computer Science (presented at the International Conference on Interactive Digital Storytelling, Springer, Cham, 2017), 137–149, accessed May 8, 2019, https://link.springer.com/chapter/10.1007/978-3-319-71027-3_12.
[52] Lucas Pope, *Papers, Please*.
[53] Dubbelman, "Narrative Game Mechanics."., 48.
[54] "Repetition, Reward and Mastery: The Value of Game Design Patterns for the Analysis of Narrative Game Mechanics," *ResearchGate*, accessed May 8, 2019, https://www.researchgate.net/publication/321043118_Repetition_Reward_and_Mastery_The_Value_of_Game_Design_Patterns_for_the_Analysis_of_Narrative_Game_Mechanics.
[55] Ibid.
[56] Dubbelman, "Narrative Game Mechanics.", 49.

Methodology and Methods

The final goal of this research is to attempt establishing a new approach for game designers with which to craft stories within videogames. In this research, narrative game mechanics[57] are studied using the cyclically applied research methodology known as action research.[58] The research applies each of the methodology's cycles to the development of a game prototype. This evocative approach to design experimentation[59] is used to explore and develop innovative solutions for generating narrative play through game mechanics. Four cycles of prototyping are undertaken, prior to a final approach being developed using critical reflection.[60] For this approach to be fully realised, it must be put into practice through an additional action research cycle, which generates the final videogame artefact for the current research. Action research does not end with the final artefact, but aims to lead to "a better understanding of research in practice, and…can instigate…change in the field of design".[61] My own practice will continue by incorporating the new knowledge gained through this research, as it relates to developing videogames.

Action Research

Action research is defined by a cyclic spiral that proceeds through the stages of planning, acting, observing, and reflecting. Each cycle continues and influences the subsequent cycle.[62] The cycles of action research proceed as follows:[63] Planning involves synthesis of a problem and possible solutions, which in turn becomes the direction for practice. Acting involves the production of a plan and creating the design. Observing involves data gathering from observations and collaborators. The final step prior to starting the cycle from the start, reflecting, involves critical reflection on the practice of design and the data generated from observations. The current research employs a modified version of this methodology, that is, it replaces 'observing' with 'playing' (see fig. 1), where rather that observing players play prototype games, I will play them myself. This involves not simply playing the games, but critically reflecting on the
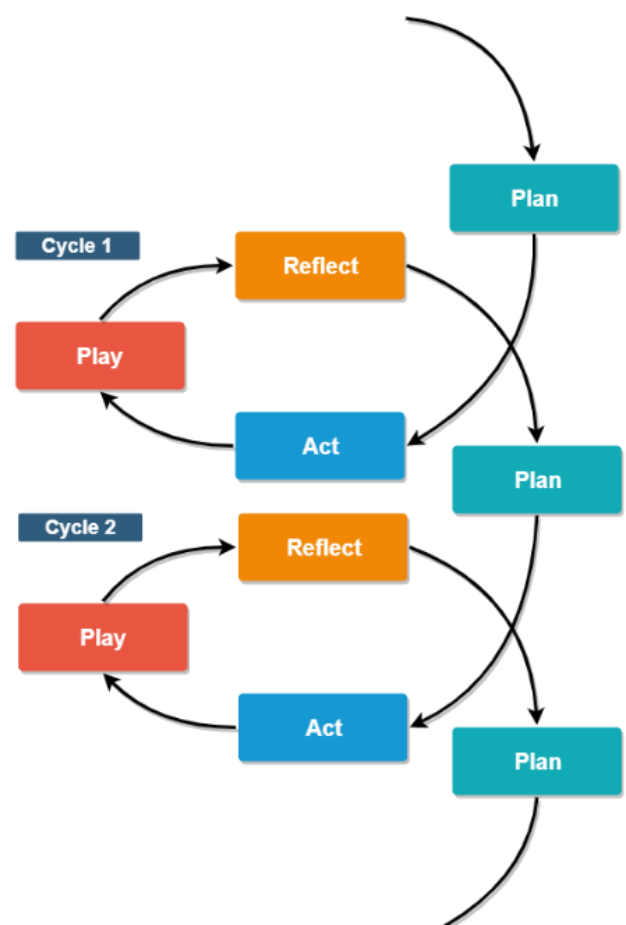

Figure 1: Cycles of action research as used in this research.

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[57] Ibid.

[58] Gjoko Muratovski, *Research for Designers : A Guide to Methods and Practice* (London : Sage Publications, 2016., 2016).

[59] Waern and Back, *Experimental Game Design*.

[60] Christine Morley, "Critical Reflection as a Research Methodology," in *Knowing Differently: Arts-Based and Collaborative Research Methods*, 2008, 265–280.

[61] Muratovski, *Research for Designers*., 200.

[62] Cal Swann, "Action Research and the Practice of Design," *Design Issues* 18, no. 1 (January 2002): 49–61., 55., quoted in Muratovski, *Research for Designers*., 193.

[63] Muratovski, *Research for Designers*., 197.

play that occurs;[64] as such, it can be considered a form of observation, as the prototypes are incomplete experimental games.[65]

There are two reasons for adopting action research. Firstly, it is a methodology that facilitates improving practice.[66] My previous experience has been in making independent games. By conducting this research, I can improve my abilities to design games, and use them to tell stories. Secondly, the method allows for investigating an idea that has to date not been clearly identified[67]using applied research, which enables reflection on, and the evaluation of the work conducted.[68] Another reason for avoiding set boundaries is to observe whether there may be any additional value to be found, beyond the current boundaries of experimental game narratives.[69] Through action research, practice can be improved and new standards can be set in the field of game design.

In the following, each step of action research as it relates to the current research's methods are provided.

Experimental Game Design

"One way to understand games better is to experiment with their design".[70]

The first step, planning, involves exploration and synthesis of current reflection on creating a prototype design. These reflections will influence the direction of the research, while the plan will help to solidify how to proceed with the research. The concept for the first prototype arose from the relevant literature being read at the start of the research, and from an intuitive notion, likely arising from my previous experience as an independent game designer.

For each prototype, a specific problem is first considered. This problem often involves a type of game to be explored, and a narrative game mechanic to be tested. Drawing, sketching, and writing during these early stages of ideation is often effected. The prototype is designed to be an evocative design experiment;[71] that is, it is not designed to be a complete game prototype. Rather, it aims to explore and tease out the more abstract qualities of the problem at hand.[72] As such, it may be incomplete, with several elements and mechanics not yet implemented, while still allowing for the game to manifest play.[73] The design is reduced by removing any elements that may obstruct exploring the specific problem identified for each prototype.

Experimental game design allows for exploring the possible contexts surrounding the research problem. One important factor of experimental game design is that it relies on each design being

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[64] Waern and Back, *Experimental Game Design*., 345.

[65] Ibid., 344.

[66] Jean McNiff and Jack Whitehead, *All You Need to Know About Action Research* (SAGE, 2011)., 14., quoted in Muratovski, *Research for Designers*., 193.

[67] Hopkins, D and Ahtaridou, E, *Applying Research Methods to Professional Practice*, 2006. In Stephen D. Lapan and Marylynn T. Quartaroli, *Research Essentials : An Introduction to Designs and Practices*, First edition. (Jossey-Bass, 2009)., 282., quoted in Muratovski, *Research for Designers*., 193.

[68] Donald A. Schön, *The Reflective Practitioner : How Professionals Think in Action* (New York : Basic Books, 1983)., quoted in Muratovski, *Research for Designers*., 192.

[69] Waern and Back, *Experimental Game Design*., 349.

[70] Ibid., 341.

[71] Ibid., 344 -345.

[72] Ibid.

[73] Ibid.

different from those preceding it.[74] Therefore, each game prototype, while influenced by aspects of preceding models, must explore different possibilities.

Experimental game design does not end after devising an initial design plan, but continues alongside game prototypes being developed. Similar to iterative design,[75] experimental game design is used to refine prototypes during their production.

Prototyping

Once the design plan has been established, the next step involves acting; this concerns the production of the prototype. The aim of this stage is to produce a playable prototype that can be ready as quickly as possible. The prototype must be developed to such a degree that it can be played, and must represent the core actions that the player will be able to perform.[76]

The prototype is evaluated and additionally developed at every stage. The first stage of the playable prototype is a rough draft that includes basic geometry and simple mechanics. If the mechanics are not yet fully implemented, but is present to a degree that facilitates acting out play using a Wizard of Oz experiment setup,[77] this stage can be used to pretend that all game mechanics are in place and functional for the sake of playtesting. In this way, moving on to the next stage of action research can be facilitated. However, if the prototype does not yet manifest play or allow for a Wizard of Oz setup to work, further development and iteration must be effected. Additional mechanics, two-dimensional or three-dimensional assets, sound effects, and music are added. Game states and menus may also be added at this point if required. Some creative common assets may be sourced as needed for prototyping purposes. The nature of game design using the Unity3D software package allows for effecting rapid iterations and the testing of games. After effecting a simple change using the software environment, the designer can push 'play' and test alterations, without having to wait for the game to build, which can take several minutes each time. This quick turnaround allows designers like myself to rapidly reflect on the progress of a prototype, and to evaluate whether the prototype manifests play. In addition, the process may also offer answers to a specific problem being considered, and/or whether it requires additional work.

Once the prototype is complete, it must be played and reflected on before the next cycle of action research can take place.

Critical Reflection

Critical reflection is a method that examines our implicit assumptions, by identifying ways in which we may unintentionally affirm discourse.[78] In order to illustrate a new approach, this research must understand and question how internal discourse is employed during the design and development of

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[74] Ibid.

[75] Muratovski, *Research for Designers*., 190.

[76] Macklin and Sharp, *Games, Design and Play*., 183.

[77] Elena Márquez Segura et al., "The Design Space of Body Games: Technological, Physical, and Social Design," May 1, 2013., quoted in Waern and Back, *Experimental Game Design*. A Wizard of Oz setup, is where you pretend the mechanics are working as they really would be in a fully realised game, much like the wizard pretended to have magical powers in the Wizard of Oz.

[78] Morley, "Critical Reflection as a Research Methodology.", 149.

games. Not only must reflection take place on what is being done; it must also be applied to analysing assumptions being made, questioning them, and discovering new understandings and methods through this process. There are two parts to critical reflection: deconstruction and reconstruction.

"Deconstruction involves identifying and questioning dominant discourse, looking for alternative perspectives and uncovering how different discourses are implicated in supporting the dominant interests".[79] In game design, internal discourse can be perceived as how the designer's personal biases about games and genres influence their design decisions. These discourses can also include expectations about designs that the designer believes to be 'good' or 'bad'. Deconstruction also highlights involvement in restrictive or unhelpful discourses that may limit practical options and thinking, through an examination of assumptions and implicit values embedded in thinking and making.[80]

The next step in the action research cycle, playing the game, takes place as part of deconstruction. This involves reflecting on experience and assumptions, not only while creating the prototype, but also by reflecting on the play experience itself. Does this prototype reflect the problem identified during the planning stage, or did the development of the prototype present new and unintended experiences?

Reconstruction starts by creating new or revised interpretations, which in turn is facilitated by reflecting on reflections. The information derived from this process will help to guide subsequent actions, appreciations, and understandings[81] as they relate to how narrative play is generated through mechanics, and how narrative game mechanics are prototyped. These interpretations can in turn create avenues for different ways of knowing,[82] which will allow the current research additional room for discussing the current knowledge used to explore narrative game mechanics and experimental game design.

The final step in the action research cycle, reflection, considers what was discovered while playing the prototype and critically analyses these findings, and compares the final three steps – planning, acting, and playing – to uncover what implicit assumptions and discourses can be formulated. These will subsequently need to be reconstructed into new understandings for future prototypes. Reconstruction provides new directions for the research, and different potential design spaces for exploration within the next iteration of the action research cycle.

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[79] Ibid., 153.
[80] Ibid.
[81] Ibid., 156.
[82] Ibid.

Discussion

Prototypes: Development and Findings

For this research, four cycles of action research were initially completed. Each cycle represented the design and production of one game prototype. Each prototype was reviewed using critical reflection, and the reflections derived inspired the direction for subsequent prototypes. Each prototype employed evocative design experimentation to explore the potential of narrative game mechanics to tell stories within games. For this reason, it was important that each prototype be different to explore many different avanues of game narratives. It was also important to keep the prototypes minimal in design and scope, focusing on how the narratives operate in each instance instead of teiiling complete stories.

The following prototypes were made in order, one after the other. All the assets, except for the bench and drawers in Snowbound, the scripts for the oscilloscope in Temp Glitch Mechanic, and a few SFX were made by myself. This includes all the scripts, music, and models and shaders .

Power Salesman

The first prototype, *Power Salesman*, is a worker simulation game. This game begins with the player arriving on an island, and it is the player's job to manage the electricity supply for the island's inhabitants by turning it off and on (see fig. 2), each time collecting a small fee. The player can use the money to slowly develop the island's power grid (see fig. 3). These mechanics were inspired by *Papers, Please*,[83] which Dubbelman employs as an example in his analysis of narrative game mechanics.[84] Dubbelman describes four mechanics that function in unison to build the story of *Papers, Please*. The initial assumption when designing *Power Salesman* was that making a working simulation game similar to *Papers, Please* would produce similar narrative game mechanics. This assumption proved incorrect, as the prototype lacked any consequences linked to the player's decisions[85]. Since it would require too much development time to execute an effective AI for the non-player characters, the potential narratives of *Power Salesman* were limited. For example, the initial design had non-player characters engaging in daily chores; then, through scripted moments, events had the potential to occur. These events were designed to clash with the player's goals of collecting money and developing the power grid. If the town held a memorial for a character lost at sea, the player had to decide if they interrupt the memorial to collect fees for the day, and in doing so, risk upsetting the island inhabitants, or whether they instead joined the memorial to effect closer relationships with other characters. By not including the AI in the prototypes, scripted events could not be effected. As a result, the narratives generated by the mechanics were limited.

By reflecting on the prototype[86], this research found testing too many game mechanics at one time an ineffective method for researching the narrative potential of game mechanics. Instead, restricting prototypes to one or two main mechanics will potentially extend the scope for exploration of possible narratives. This prototype also attempted to explore the idea of providing enough space for the stories to form in the player's mind.[87] The research found that providing too much space through non-gameplay moments did not generate narrative play (see fig. 4).

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[83] Lucas Pope, *Papers, Please*.
[84] Dubbelman, "Narrative Game Mechanics.", 47.
[85] See Appendix 1.
[86] Ibid.
[87] Upton, *The Aesthetic of Play*., 281.

For the next prototype restricing game mechanics was suggested as a way to focus the narrative enquiry. Instead of adding a lot of different systems, what are the most minimal mechanics that can be used to create narrative through the mechanics.

Figure 2: In power Salesman the player can interact with the controls or directly turn the power on at the windmill.
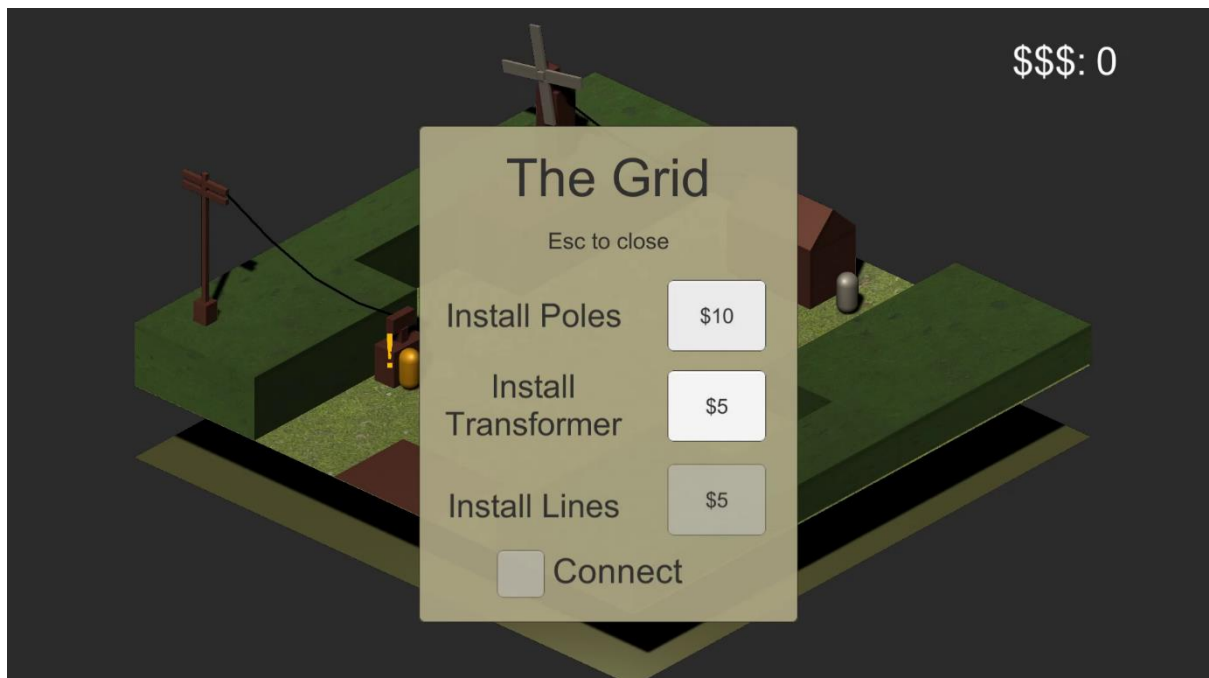

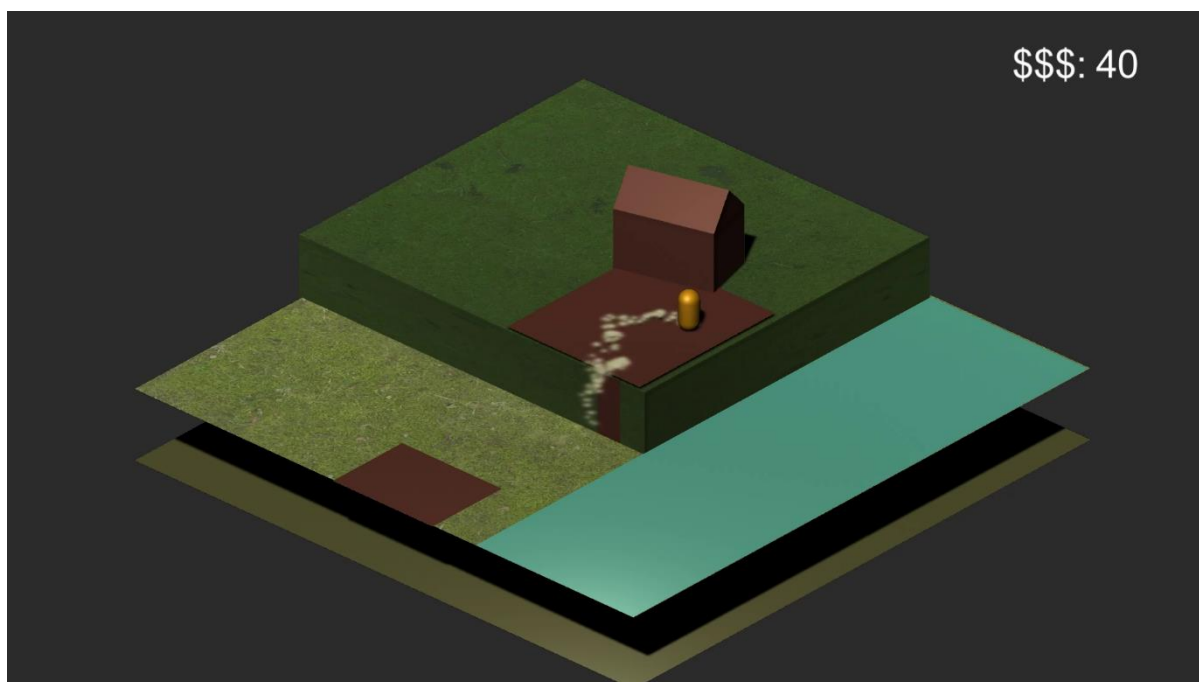*Figure 3: Screen for upgrading the power grid in Power Salesman.*

Figure 4: One of several areas to explore on the island, but without AI to interact with, gameplay is minimal.

Snowbound

The second prototype, *Snowbound*, is a first-person walking simulation game, and the most successful prototype in terms of its ability to generate narrative play. During the design of this prototype, suggestions from previous reflections,[88] that is, to restrict mechanics, were adhered to. *Power Salesman* is a third-person game that restricts the player's controls. *Snowbound* uses a first-person control scheme, where game mechanics were restricted to looking at and examining items. These mechanics relate to the player's actions directly and do not rely on complex interactions of mechanics to generate narrative play. When the player looks at a specific item or examines it, the environment behind them changes without them noticing. When they subsequently turn around, they are in a different space, the previous setting having disappeared. The paths available in the game differ depending on which item the player interacts with, or how they interact with it, creating a branching narrative based on subconscious choice.

In *Snowbound*, the player takes on the role of someone lost in limbo, exploring their memories to discover how they died. This idea for the narrative was derived from developing the prototype.[89] The first iteration was closer to a proof of concept for the game mechanics, and was functional, but lacked context. This initial prototype indicated potential but lacked any evidence of narrative play (see fig. 5). Reflection at this point found that without sufficient contextual elements, such as art assets, the prototypes could not generate narrative play. To further explore the potential of the game, the prototype underwent additional development. Three-dimensional assets, atmosphere, particle effects, and a selection of simple sound effects were added. The idea of exploring limbo and moving

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[88] See Appendix 1.
[89] See Appendix 2.

from one memory to another arose directly from the changing environment mechanic. Each environment therefore represents a different memory. The final iteration of this prototype proved the researcher's suspicions about restricting the number of mechanics used for the prototype correct, and narrative play was generated from the mechanics. An example of this narrative play happens when the player first encounters the study environment (see fig. 6). After entering the space, the door closes behind the player. The study has no walls and there is a large picture standing on the floor at the far end of the room. The picture is of a snowy forest and looks like a window into another region. The study has no ceiling, and snow is falling into the room, mimicking the forest image on the floor. When the player looks around the back of the picture the scenes changes, and when they turn around again, they are in a forest that looks like the one in the image (see fig. 7). This connection of places, not only by moving the character between physical spaces, but also through contextual elements in the room, allows players to explore the potential places that the story can take place in within their mind. In this manner, the player can begin formulating questions about potential narratives.

One aspect that did not work in this prototype was the branching narratives,[90] because the different environments were not sufficiently different from one another to offer different narrative potentials. Through reflection,[91] this research found that creating the prototype without a pre-written narrative structure to guide it made it difficult to piece together a cohesive story. Additionally, restricting the mechanics proved to provide greater exploration of narrative play.

For the next prototype, looking into vignette games was suggested as a way to move focus away from story, and towards narrative. Vignette games don't always rely on traditional narrative techniques used in other media and games could lead to greater understand of how narrative mechanisms work in games. It was also suggested to focus on sequencing and audio development as that was an area yet to be explored in othe prototypes.
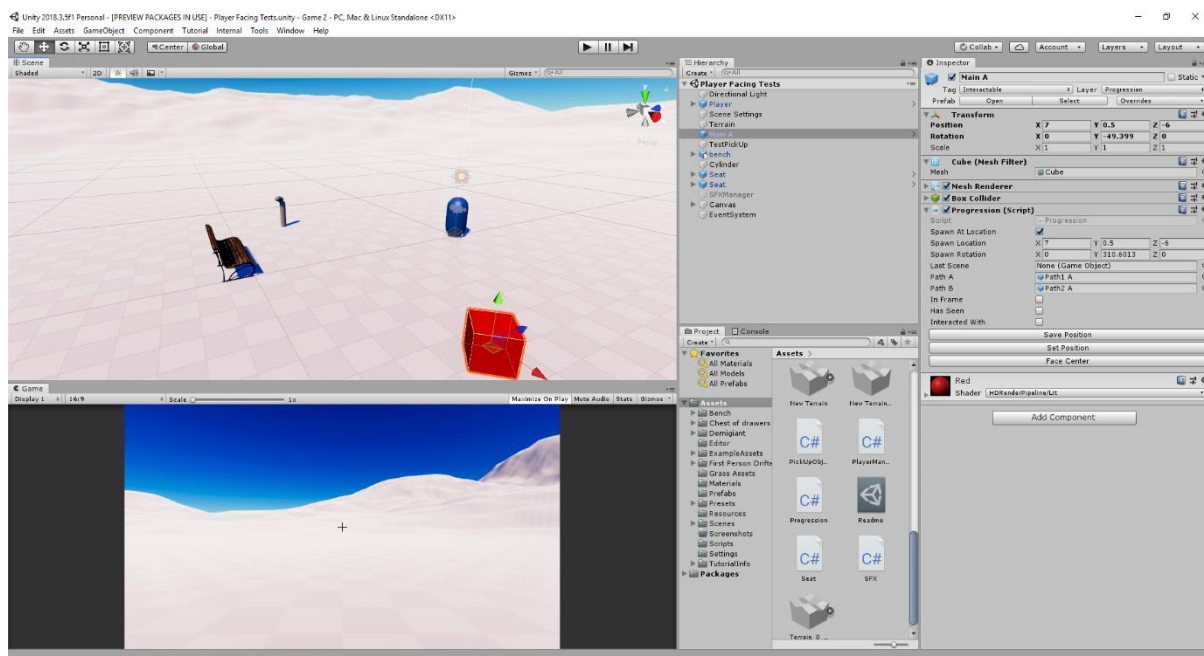

Figure 5: The initial prototype for Snowbound has the main environment changing mechanics.

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[90] Ibid.

[91] Ibid.

Figure 6: The study in Snowbound.

Figure 7: The forest in Snowbound.

Cosmonaut

The third prototype, *Cosmonaut*, is a small vignette game about a cosmonaut stationed on an alien planet, and investigating ominous geometry on the planet's moons. A 'vignette game'[92] is similar to a vignette found in literature, and attempts to briefly elucidate the unique nature of an experience. These games can be extremely brief, and focus on evocative experiences and characterisations.[93] While a vignette game does not often focus on progressing a game's narrative, they have been used in the game, *What Remains of Edith Finch*,[94] to help relate the different narratives of individual family members.[95] For this reason, a vignette game structure was chosen for *Cosmonaut*. Since the mechanics are fairly minimal in this prototype, creating refined art and sound assets were important. The reason for this is that art and sound help to bring a game to life,[96] and to explore the characterisation of the world therein. Additionally, to help observe whether narrative play manifests in vignette games, the prototype had to exhibit a degree of sophistication.

The mechanics for this prototype are minimal. Two of the overall eight moons are available to explore. Each moon has a setting that the player can observe by panning, which is effected by clicking and dragging actions. There are geometric shapes to click on that are activated; when they are all activated, the scene will change and the music will evolve. The sound design in this prototype helps to bring the atmosphere and character of each location to life.

During the development of the prototype, a menu was added to provide more context to the game world (see fig. 8). This menu becomes a toy that the player can spin to impact the rotation of the moons, and to alter the speed of the atmospheric audio. Compared to *Power Salesman*, where the time between gameplay felt empty,[97] this menu allows for playful moments to occur between levels, during which the player can think about and consider the narrative, without becoming bored.

This research found that vignette games are not always capable of using mechanics to generate narrative play.[98] In *Cosmonaut*, this happens when finishing each moon level, that is, the narrative play ends. There is no ongoing continuation between each moon that provides time for narrative play to take hold; instead, each level is self-contained(see fig. 9 & fig. 10). The playful menu helps to provide a narrative context and time for narrative play, but the different levels do not continue this. Potentially, if the levels are longer, and there is a deeper connection or reason for exploring the game spaces, the game may be able to generate narrative play. This prototype was limited in scope by my understanding of vignette games.

Through reflection,[99] this research found that the space required for narrative play to manifest does not have to infer a lack of gameplay. Sufficient space and time can be provided for narrative play alongside mechanics. By using the toy in *Cosmonaut* as a playful mechanic, or having narrative game mechanics focus on executive play, potential space can be provided for the player in which to experience narrative play, without becoming bored.

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[92] "Persuasive Games: Videogame Vignette," accessed October 26, 2018, https://www.gamasutra.com/view/feature/131942/persuasive_games_videogame_.php.

[93] Ibid.

[94] Giant Sparrow, *What Remains of Edith Finch* (Annapurna Interactive, 2017).

[95] Philippa Warr, "State of the Art: How Edith Finch's Most Memorable Scene Works," *Rock, Paper, Shotgun*, June 1, 2017, accessed January 15, 2019, https://www.rockpapershotgun.com/2017/06/01/what-remains-of-edith-finch-cannery-story/.

[96] Salen and Zimmerman, *Rules of Play*., 377.

[97] See Appendix 1.

[98] Ibid.

[99] Ibid.

For the next prototype returning to the worker sim genre was suggested as the first prototype 'Power Man' was unsuccessful in generating narratives, there is still space for exploration in this type of game, evident in games like 'Papers, Please'. It was also suggested that the focus of the main mecanic be more playful and toylike to see if tension between reflexive and executive attention can help create narratives.
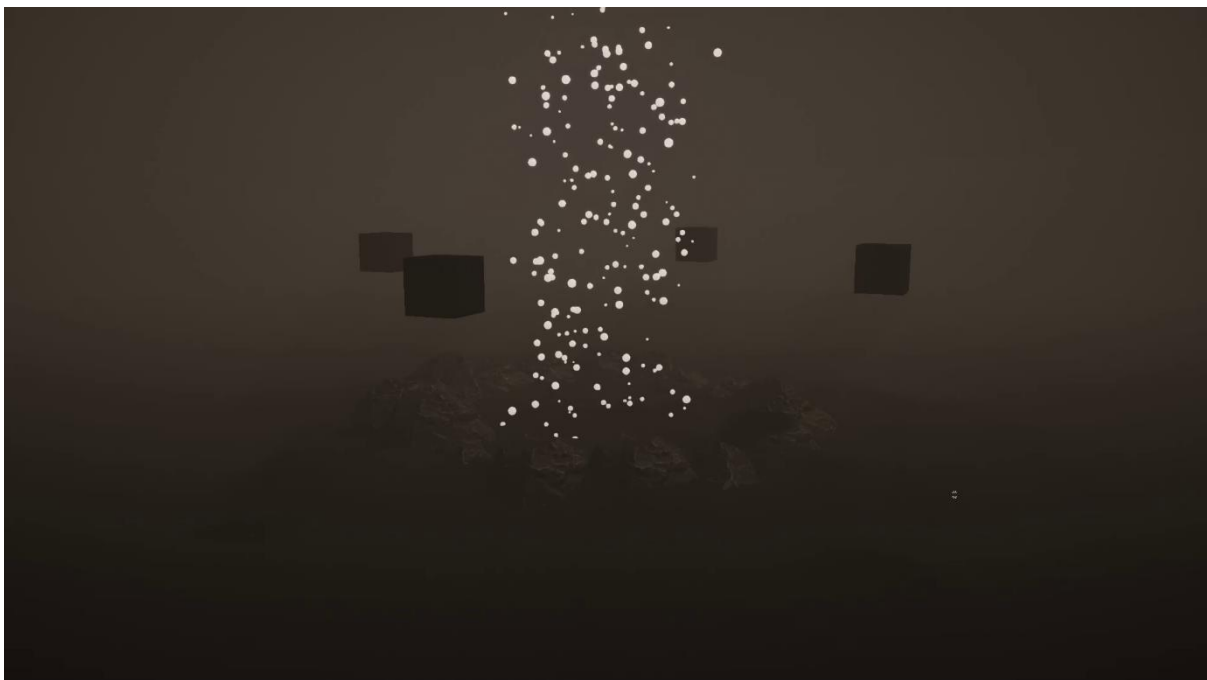

Figure 8: The main menu for Cosmonaut.

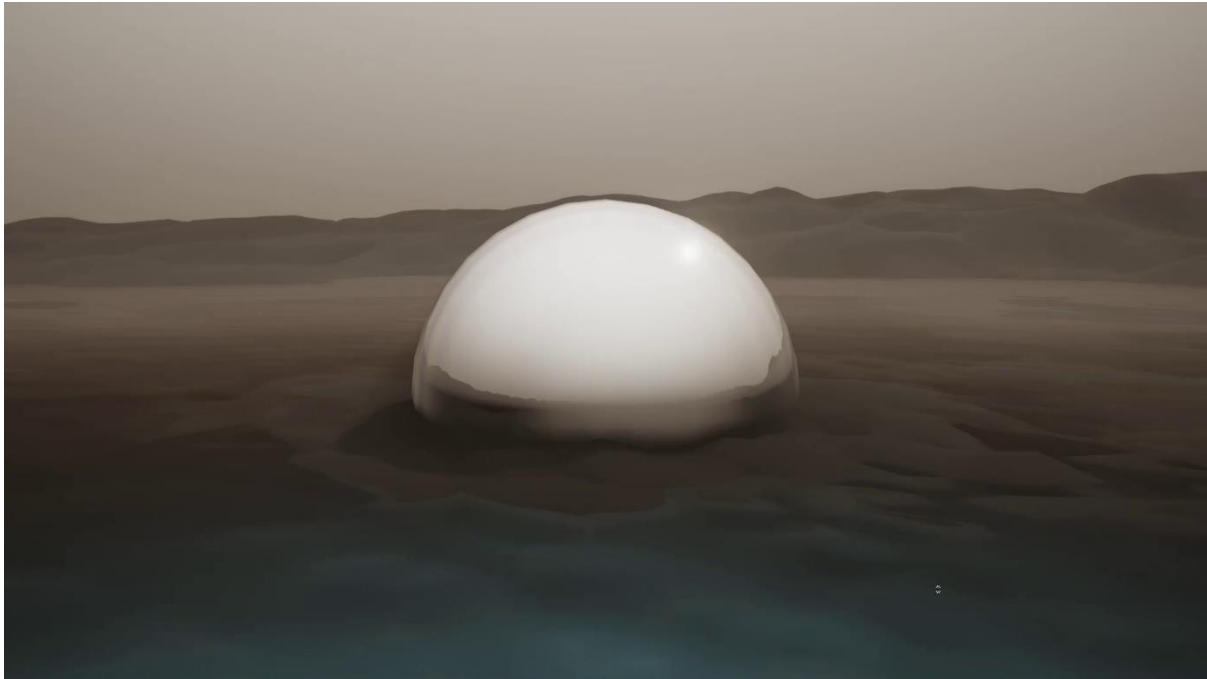*Figure 9: The first level in Cosmonaut.*

Figure 10: The second level in Cosmonaut.

Temp Glitch Mechanic

The fourth and final prototype created, *Temp Glitch Mechanic*, is another working simulation game. The reason for making another such game was inspired by research, and creating the music for the first three prototypes, which was done using a drum machine with digital effects similar to modular synthesisers. The idea of the game's primary mechanic is that of a toy that is more enjoyable to play with than completing the task at hand. The player takes on the role of a temporary glitch mechanic, fixing glitches in an obscure system. Each day, the player punches a timecard when they start work (see fig. 11), spends the day fixing glitches, punches their timecard before heading home, and then spends the evening paying bills, reading the news, and/or buying more modules for work. The player fixes glitches at work by using different modules, which serve their function in the form of modular synthesisers, with an oscilloscope indicating the glitch being worked on.

The prototype game exhibits the workstation mechanic at work (see fig. 12), where the player can play with the modules to generate different images on the oscilloscope; completing jobs, earning money, and buying additional modules were not implemented (see fig. 13). The workstation required most of the development time available; the rest of the game was played using a Wizard of Oz setup.

This prototype was expected to generate narratives linked to struggling to finish the day's work, which would result from the player becoming distracted by playing with the modules. As a result, they would have trouble paying their bills, due to not having earned enough money working. However, this research found that too much playfulness can take over the primary goals of a game,[100] and is too

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[100] See Appendix 4.

distracting for narrative play to occur. If the player's attention is focused on playing with a toy, the goal of narrative closure will be ignored.

As with the first prototype (*Power Salesman*), *Temp Glitch Mechanic* also lacked story structure, indicating that stories do not piece themselves together without some form of structure and/or guidance. This prototype also retained the contextual elements of the narratives to a minimum, which resulted in a shallow narrative experience, with little narrative play coming from the tension between reflexive and executive attention.
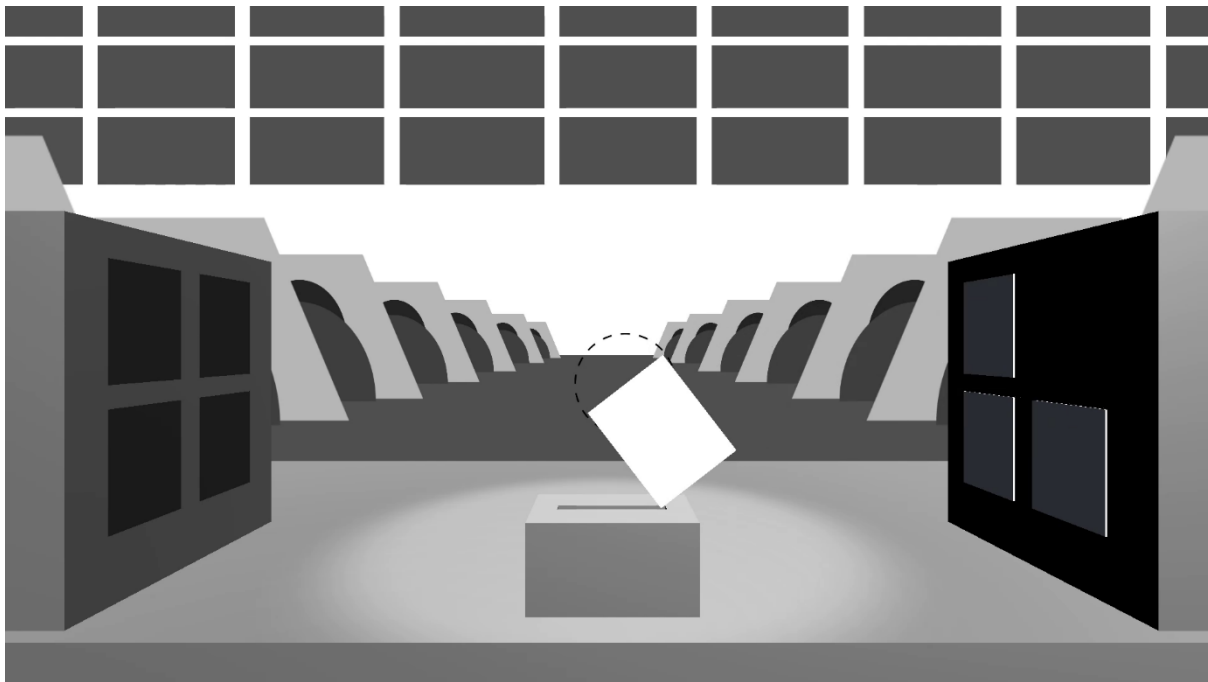

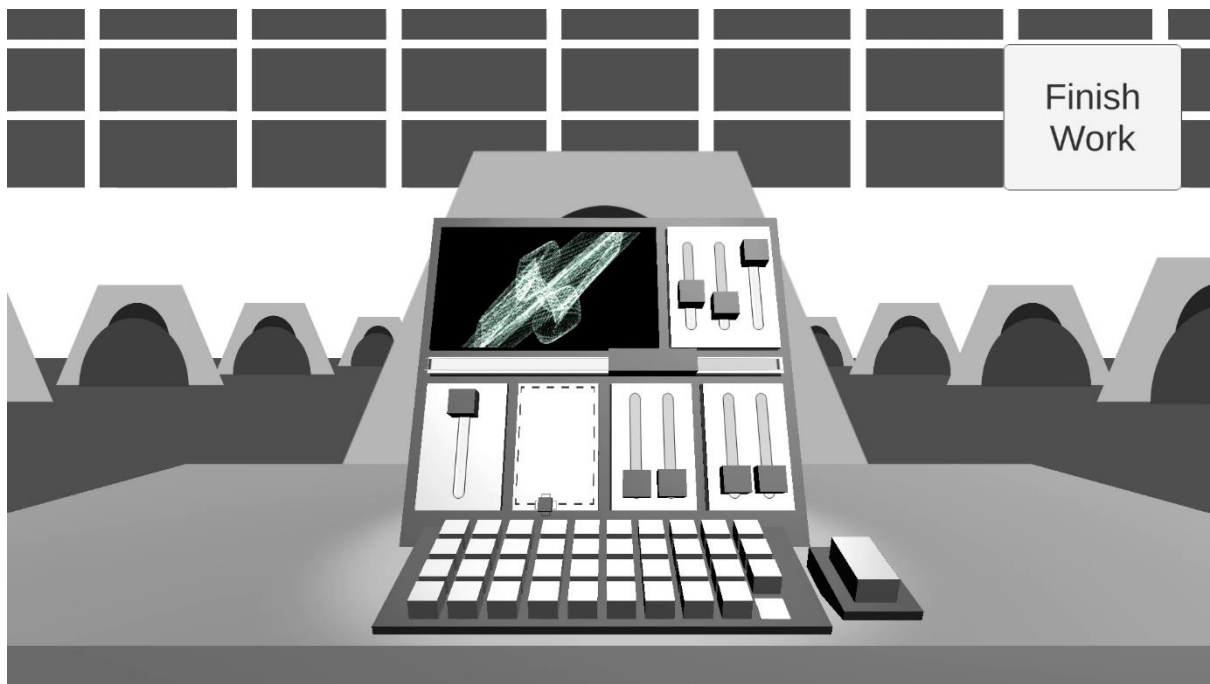*Figure 11: The timecard punch scene from Temp Glitch Mechanic.*

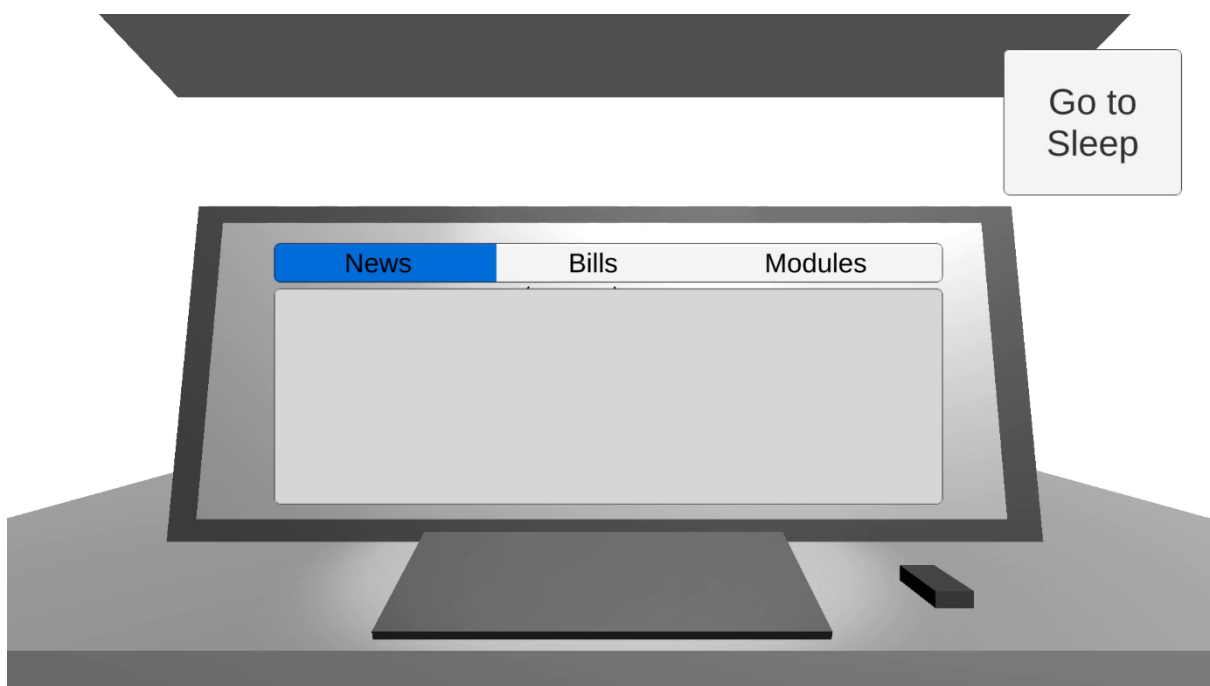*Figure 12: The main workstation in Temp Glitch mechanic.*

Figure 13: The home screen in Temp Glitch Mechanic.

Approach for Final Game Prototype

Through reflection on the four created prototypes, four key points were identified for use in designing the final game artefact.

Throughout the development of prototypes, there were often moments in which the mechanics alone were not able to generate narrative play. The prototypes were reiterated and contextual elements, including three-dimensional assets, sound effects, music, and visual effects, were added to assist the mechanics generate narrative play. It can be argued that the narrative game mechanics need contextual elements to work, otherwise they may not be able to generate narrative play. The most successful example of narrative play among the prototypes was *Snowbound*, which changed drastically from the initial to the final prototype. The moment in the game when the player turns around, following change to the scene outside the player's field of view, signifies a story beat to the player. The problems found in *Cosmonaut* relate to narratives between levels feeling disconnected, and indicates that **story beats need to remain connected in order to generate narrative play.**

While each of the prototypes explored narrative game mechanics from different perspectives, and alongside experimental game design, it became apparent during reflection sessions that none of the prototypes managed to tell a story. Each presented narrative through mechanics in different ways, but narrative play did not extend to form the start of a story. The exception in this regard is *Snowbound*, which manifests narrative play through its use of shifting scenery. Reflection on *Snowbound* found, however, that developing the game without a pre-written story structure was difficult. Reflection on *Temp Glitch Mechanic* also highlighted similar difficulty related to connecting story beats without a structure. These findings could indicate that **having a clear story structure can help to direct the development of narrative game mechanics.**

Reflection on *Power Salesman* found the recommendation that mechanics should be restricted, since too many mechanics made it difficult to explore narrative game mechanics. *Snowbound* and *Cosmonaut* both had their mechanics restricted, and this proved useful for generating narrative play. Similarly, the playfulness found in the *Cosmonaut* menu provides a playful space for the player in which to consider narrative potentials at play, while the playfulness of *Temp Glitch Mechanic*'s primary game mechanic has the opposite effect, and distracts from narrative play. This may indicate **that in order to generate space for narrative play to occur in the player's mind, the game should be restricted to one or two primary mechanics. These mechanics can be playful, but this playfulness should nonetheless be restricted in order to avoid distracting the player's goals of achieving narrative closure.**

Creating a working simulation-style game like *Power Salesman* and *Temp Glitch Mechanic*, with a system based on a day-and-night cycle, earning money to pay for rent and similar bills, and incorporating repetitive mechanics, did not provide space for a broad scope of story types to be told. While both games attempted to tell different stories, both ended up feeling similar. For example, a romantic story will be more difficult to tell if the goal of the game is based around the struggle to make enough money to pay for rent each week. It may be possible, but the design of the system may nonetheless dictate the types of stories that can be told. **Having mechanics that are more open to manipulation and change may help games to better define story beats.** These, in turn, can potentially give rise to the possibility of a larger variety of stories to be told through narrative game mechanics.

Final Game Prototype: *Beacons to Oceans*

For the final game prototype an approach needed to be used that could turn story ideas into game mechanics. Generating narrative play through game mechanics proved difficult in the four early prototypes because of a lack of story beats. Having a clear story structure of connected narrative beats can potentially provide direction for how we tailor the game mechanics as we develop the final prototype. The four initial prototypes needed to be minimal for clear analysis of the narratives generated through play. The experimental nature of the design allowed for each prototype to explore different ideas about narratives in games, and compare that against a lack of narrative, to see what elements were essential in developing an approach for making these games. Beacons to Oceans was a first test of this approach, which was further refined into the findings presented in the conclusion.

Following the four key points identified through reflection, the final game prototype, *Beacons to Oceans*, was developed. This prototype is a first-person walking simulator, in which the player carries a beacon that can create a link between worlds. The beacon is like a staff, which can be turned on or off to generate a field around the beacon. The story begins with a mysterious package containing the beacon arriving at the main character's home, which pulls them into a world between worlds. It is subsequently revealed that the package had been sent by their daughter, previously assumed dead after falling off a yacht at a younger age. It is now up to the player to traverse 'the in-between', find their daughter and bring her back to the player's world.

Development of *Beacons to Oceans* began by writing the story. To have a clear story structure, the beat sheet applied for development of *Save the Cat* was used. Writing a complete outline of the game using the beat sheet proved difficult, because having no game mechanics presented a lack of focus for creating the story. As such, designing the mechanics and writing the beat sheet became a back-and-forth iterative activity. When ideas for the story would start to become difficult to find, a switch was made to drawing or programming potential game mechanics. These would often then provide inspiration and context to story. This back-and-forth process made the beat sheet writing and design of the mechanics easier to achieve.[101]

To restrict the game mechanics, a first-person perspective was selected, which saved prototyping time. Thus, rather than focusing on creating an animated character, the prototype could focus on creating the narrative game mechanics. Several smaller prototypes were made to test different mechanic ideas, at the same time the story was being written. This process facilitated discovering a mechanic that could potentially create narrative play for the story, rather than assuming the mechanic would generate narrative play without playtesting it. The mechanic was restricted to the beacon, activating it for a moment (see fig. 14), or securing it in the ground to keep it switched on (see fig. 15). How the beacon is used in the game depends on what is required for the story; for example, the player can use it to clear a path by pushing rocks out of the way (see fig. 16), or to activate a lighthouse to bring some of the player character's home world into the in-between world (see fig. 17). The aesthetic style was also restricted to retain a rapid prototyping process; simple gradients with pastel colours, an outline shader, and no lighting were implemented in this regard.

To ensure that mechanics remained open to manipulation and change – as a means to help define story beats throughout the game – multiple ways in which different objects in the playspace can interact with the beacon mechanic were created. For example, some objects can be pushed away from the beacon when it is turned on, while other objects appear or disappear (see fig. 18); depending on what is required for the story moment, different interactions with the objects are used to present the player with different information. These mechanics were used to generate narrative play by initially revealing information about the backstory of the player character; thereafter, once the player realised that the goal of the story was to find their daughter, the mechanics are manipulated to generate story

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[101] See Appendix 5.

beats. For example, at a later point in the game, once the player becomes used to using the beacon as their primary means of interaction with the world, in a bid to drive the story forward to the 'All is Lost'[102] story beat, where the player needs to feel that they have essentially failed at rescuing their daughter, the beacon is taken away from the player. To give rise to the 'all is lost' feeling, the player's primary interaction with the objects and playspace is restricted.

In order to keep the story beats connected, the beat sheet was employed to direct the changes and restrictions placed on the primary mechanic. For example, at the start of the game, the player discovers the beacon staff. When activated, the staff can be used to move objects; the staff can also connect worlds to bring parts of the player's world into the 'in-between world' at certain locations. At a later point in the story, the beacon staff brings a different area into the in-between world, which presents information to the player about the fate of their daughter. Connecting the story beats through the restriction and modification of the mechanics can potentially help drive narrative play in the players mind.

Figure 14: Turning the beacon on while holding the staff.

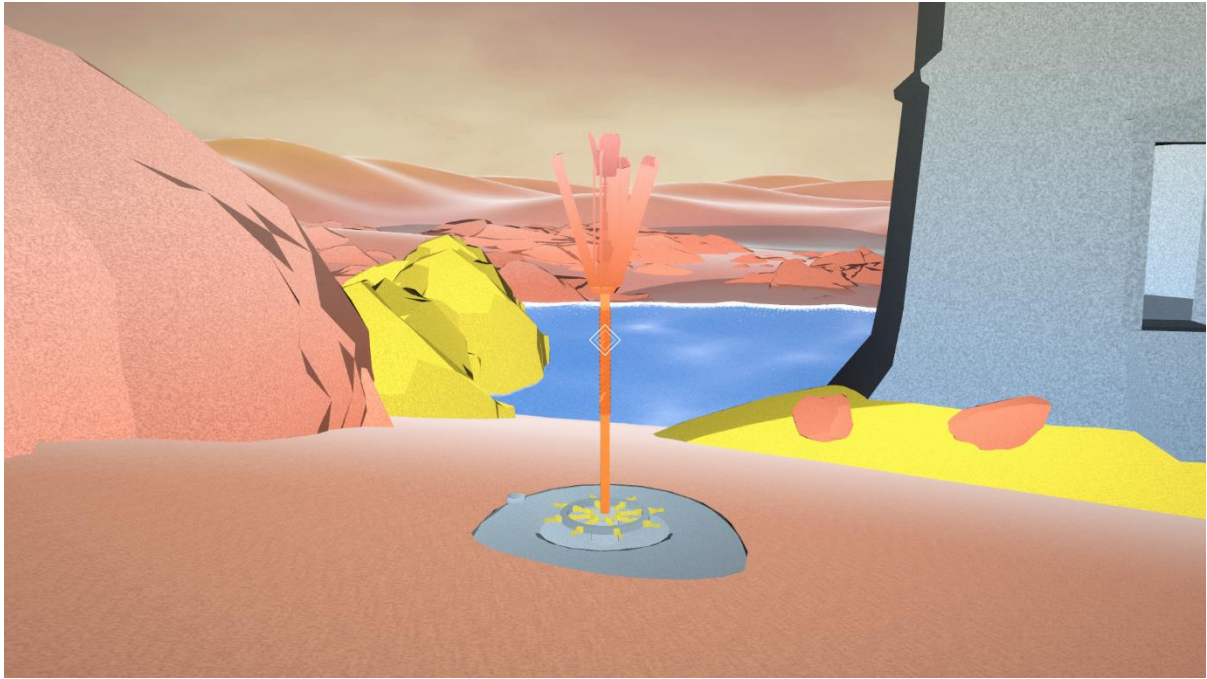
[102] Snyder, *Save the Cat!*, 86.

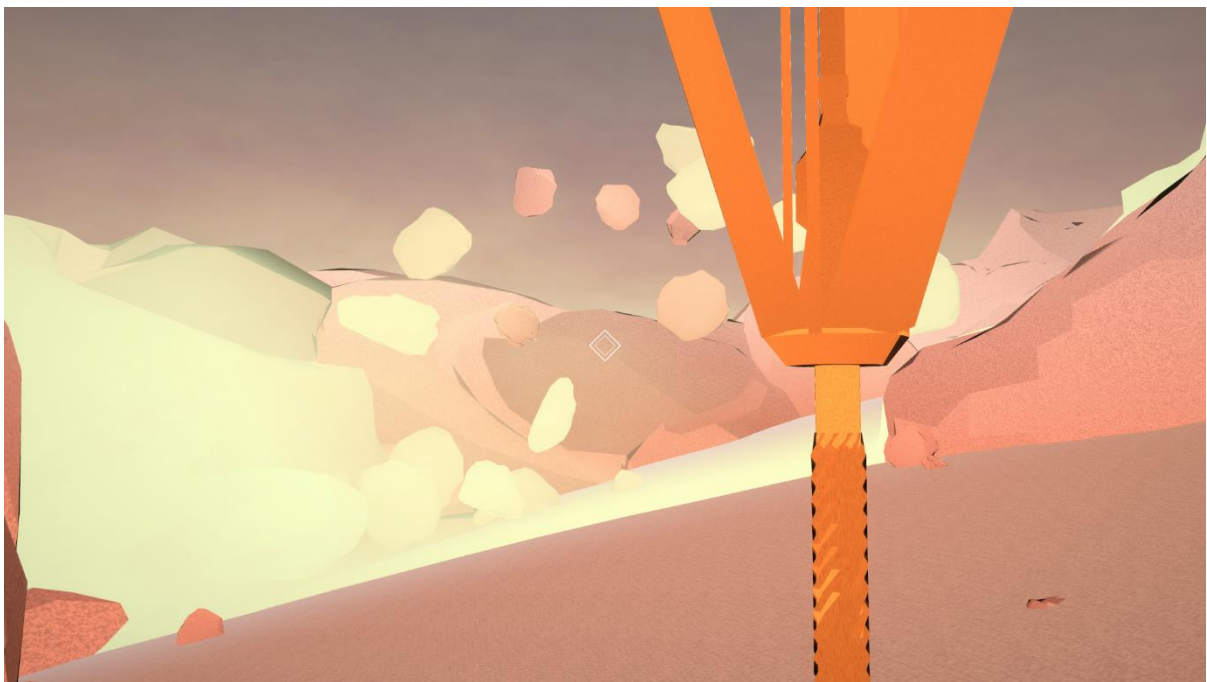*Figure 15: Planting the beacon in the ground keeps it powered on.*

Figure 16: Using the beacon to clear a blocked path.

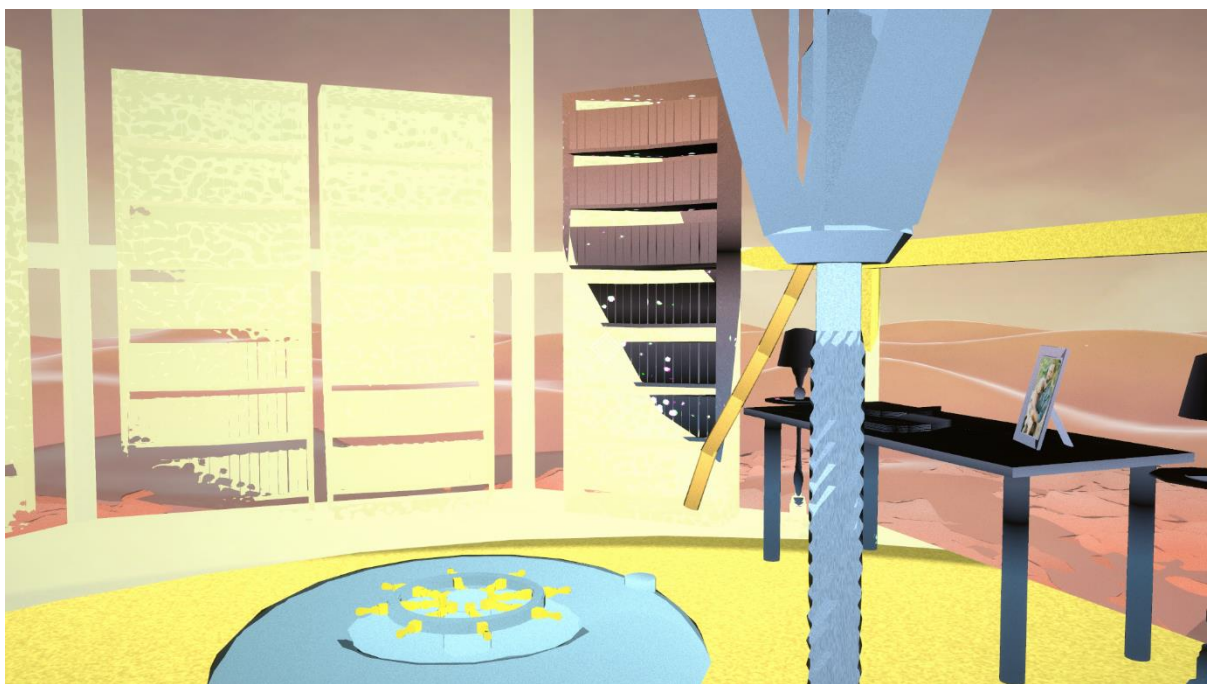*Figure 17: Using the beacon to power up a lighthouse.*

Figure 18: Objects appearing as the beacon is turned on.

Conclusion

Conducting the present research led to four game prototypes being created. From these four prototypes, four key points were considered in an approach for the development of the final game prototype. Using these four key points to help create the final game prototype, a four-step approach was synthesised, which designers can use to turn the stories they wish to tell into mechanics that generate stories in the minds of the players.

The four synthesised steps are: authorial expression, experimental game design, narrative game mechanics, and narrative play (see fig. 19). These steps do not necessarily have to be followed in sequence, thereby allowing for a back-and-forth approach to be effected between steps, as is often the nature with iterative design.

Figure 19: Four-step approach for game designers to use when developing narrative game mechanics.

The first step, authorial expression, involves the story the game designer wishes to tell. This story structure is best expressed through a method such as a 'beat sheet'. The initial four prototypes focused on exploring narrative mechanics instead of telling complete stories, through this exploration this research found that having a story structured by the specific beats made it easier to use the game mechanics to generate narrative play. Using a beat sheet for the final prototype proved useful not only in terms of directing narrative game mechanics, but also when combined with experimental game design. The final prototype shows how to move between two story beats.

Experimental game design facilitates turning story ideas into mechanics. This process presents the most difficulty in the four-step approach, as it requires designers to spend time exploring and testing the different game mechanics they believe may generate narrative play. Restricting the number of mechanics, and implementing mechanics that can be manipulated, can help to direct them in such a manner that they create narrative beats.

Narrative game mechanics are used to generate narrative play. For a game mechanic to be a *narrative* game mechanic, it must support the construction of engaging stories.[103] These stories are understood by the player through narrative play. This research discovered that the ways in which these mechanics are manipulated gives rise to how story beats can be generated. A 'story beat' represents an instance that offers different narrative interpretations about the future potential of a story.[104] This instance may involve a change being made directly to the mechanic, a change effected to the playspace, or to objects that interact with the mechanic.

In a videogame context, 'narrative play' represents the player's understanding of the story.[105] Here, the story is not told to them by a narrator, but pieced together in their own mind. The goal of the player should not be focused on completion or competition, but on achieving narrative closure for the

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[103] Dubbelman, "Narrative Game Mechanics.", 39.

[104] Upton, *Situational Game Design*., 115.

[105] Upton, *The Aesthetic of Play*., 259.

story. If the game mechanic is too playful, it can distract from narrative play; alternatively, if the mechanic promotes a gamist agenda, the player may ignore narrative play.

Limitations and Future Research

Using the above approach, game developers may be able to begin exploring the narrative potential of videogames. This approach represents only a start, and further testing and research will prove useful. Because this approach is meant for game designers, it would prove useful to test other designers using this approach. They may find the approach needs adjustment and refinement, which can only happen through subsequent use.

Because this research has mainly used critical reflection to test the prototypes and see what narrative play is present in each instance, user testing has been limited to the main research. It would, therefore, be useful to test future prototypes with other players, to gather their experiences and understanding of narrative play. Potentially, creating a third-person game may help players connect with the primary game character to a higher degree.

Another limitation of this research was the use of story structure. All the designed prototypes primarily employed a linear narrative, but further testing using branching narratives or multiple endings may provide different results. It may be that this approach is only useful for linear narratives. Nonetheless, the present research provides a starting step for navigating the complex context concerning the narrative potential of videogames.

Summary

This thesis demonstrates a first attempt at using a four-step approach to generate narrative play in videogames, and while nowhere near finished, it appears to be a good first step towards a framework that fosters narratives in games through game mechanics. Using experimental game design to prototype game mechanics, and reflect on the development and outcome, has proven a useful method that can be continued into practice.

The narrative potential of video games isn't limited to what we currently understand. This research scratches the surface of new possible ways we can tell stories in videogames. By experimenting with narrative game mechanics and stripping away known narratives this research was able to spot the beginning of new narratives in videogames and develop a four-step approach for other game designers to follow. This approach can allow the game designer to remain the author of the story, instead of the player authoring their own story; with gameplay supporting the generation of narrative play, instead of distracting from it. Further research following and testing this approach could expand this area of unknown narratives into a vital process for telling new stories in the video game medium.

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Appendix 1

Prototype 1 Reflection: Power Salesman

Problem Statement:
My initial assumptions about the hidden narrative potential in games were that it had to do with using gameplay in a way to tell the story. Narrative game mechanics give me a way to explore this hunch. The paper used Papers, Please as it's example game, so it would be good to make something that has a worker sim like quality to it. Also, Narrative Play talks about the stories taking time to form in the player's mind. So, I want to make something like Animal Crossing where you have time to explore. And have a player avatar to feel you inhabit this world.

Initial Design:
You play as a power salesman. You arrive on the island to find the power grid non-existent and the inhabitants without power. It's your job to get around the island to each person, turn on their power for the day and collect the fee. With your earnings, you can eventually add power lines to connect everyone, automate systems, and eventually build a hydro station. Each inhabitant on the Island lives their life differently and will wander around the island as they complete their own tasks for the day. The inhabitants can then be authored for moments of narrative tension. For example, one of the first people you help with power is an old surfer living just outside of town. He goes out surfing sporadically but always comes home for dinner by a bonfire. One day he doesn't come back from surfing. The townsfolk decide to hold a small ceremony celebrating the surfer lost at sea. As a power salesman, it's your job to provide power and collect fees, but on the day of the ceremony, you might decide collecting fees is inappropriate. These meaningful moments of authored AI systems colliding with the players intent to complete all their tasks for the day can create meaningful story moments, that over time build a strong story of the island into the player's mind.

What the prototype ended up as:
The prototype has the base system for collecting money, turning on the power to make people happy, and building power lines to automate the system. It's missing a day/night cycle, and NPC AI. In the fully realised version of the game, each AI would have a set of tasks and needs they would manage each day. The town was supposed to start out small as well and grow over time as more power became available more people would move there.

Thoughts I had during development:
It occurred to me early on that the AI system was going to take to long to implement, instead of this, I had one non-player character static so I could test the system of building and collecting money. Because of this, I found that simply turning the power on to collect money wasn't very interesting, so added the ability to build powerlines and transformer to optimise money collection.

Reflections on Play & Deconstruction:
While playing the game, I found one non-player character was maybe not enough to test the narrative potential of these mechanics. The interesting story moments meant to happen between the players intent to collect money and build, and the non-player character doing something that gets in the way didn't really manifest in play. Although this working style game supports a gamist agenda style of play and would potentially do more harm to the narrative then good. I can still see potential in this game to tell evocative stories; they would be more reliant on scripted events to happen.

While having a player character that can walk around makes the game feel like somewhere you could spend your time wandering, the character felt slow walking around and boring at times. Animations and more characters to talk to or interact with would make it more interesting.

I thought this game would have had a similar narrative play to papers, please. But this was an assumption, and, in the end, it has its own play, limited by a reliance of too many systems intersecting. I took all the parts I thought would work from other games and put them into this game instead of selecting one to explore. While reducing the assets and prototype down, I didn't reduce the game mechanics down to understand how narrative game mechanics work fully.

Reconstruction:

I need to change the assumption that stories will come out of the intersection from different mechanics. Instead, there needs to be intention behind those intersections. The idea of the game feeling inhabitable doesn't require a player avatar; it would then be good to try different ways in which the player feels connected to the game without a player avatar like first-person controls.

In the next prototype, I need to restrict the mechanics, focusing on one or two instead of several unrelated ones. Also, it would be good to try something different from a working sim style of game. How else might I use narrative game mechanics?

Appendix 2

Prototype 2 Reflection: Snowbound

Problem Statement:

If we reduce the mechanics down to the simplest forms, what do we have available to us? Making a first-person game that would be walking and looking. This is like a walking simulator/literary game like Gone Home or Proteus. If I keep the focus on walking around and the narrative mechanic comes from what you look at or interact with, then we can start to see some interesting places this could go.

Initial Design Goals:

In this game, you play someone in limbo working your way through your memories to discover how you died. This is never stated at the beginning of the game, as you play more, clues about your death are presented until you ultimately meet your fate. Depending on what you look at or interact with a different path will appear behind you, as you turn around, the current scene disappears, and you're transported to your new location.

Part of the game then is to explore branching narratives while keeping player choice to a minimum. If the player must choose between two arbitrary options, then the choice is meaningless. But instead, the player is lead down a path to experience their own story in a game, where simply by how they play the game they are making meaningful choices that influence what story they experience.

What the prototype ended up as:

The prototype lets you play through from beginning to end. There is only one ending now, but multiple ways to get there. Looking at certain objects will spawn new scenes, so will picking up certain objects. You can also sit on benches and open drawers as examples of the types of interactions that could be available to you. There are some small playability problems with objects disappearing in front of you, and areas that are easy for the player to get lost in.

Thoughts I had during development:

The initial prototype was all basic geometry. This made it difficult to experience any narrative as it felt more like a tech demo. Some context was needed to make such a simple mechanic meaningful. So, I built a level kit and expanded the levels to have full areas you could explore. I also added a dark shadowy fog to make it feel more like you're going between memories. The areas were often small and larger areas with parts in each area that change would make the experience stronger. For example, if there was a house where the contents of rooms can change depending on what you see and experience in other parts of the house. So, you might see a child's room painted blue at first but change to pink if you find a picture of a daughter. Also, the story came out of the development of the prototype. I didn't start with a defined story, but let the mechanics direct it.

Reflections on Play & Deconstruction:

The final prototype has a lot of narrative potentials. Although the different paths through the prototype didn't change the story, I think this was because of a lack of context. Each set transition needs to make sense to the player and offer some connection which they can piece together into the story. Currently, most of the sets feel much the same.

There wasn't much more designed of the story apart from exploring your memories to discover how you died. This lack of structure made it hard to piece together a cohesive story and could potentially be pushed further.

Reconstruction:
I think my initial assumption about restricting the narrative game mechanics was correct. It allowed for greater exploration into one experience. I should take this further and try restricting the story down to focus solely on the narrative. Using an alternative vignette-style game instead of a full story. Adding more context to the prototype halfway through development made the experience feel much more whole, which meant the narratives had more time to shine through. The next prototype should push these ideas further.

Appendix 3

Prototype 3 Reflection: Cosmonaut

Problem Statement:
Continuing from the last prototype, this game will be a simple vignette game, where the mechanics and story are kept to a minimum, focusing on atmosphere and characterisation. This prototype also has high detail art assets to see if my last assumption that more context in the prototyping phase really helps understand the narratives better.

Initial Design Goals:
In this game, you play as a cosmonaut stationed at a strange alien planet. You're presented with eight moons to explore, each containing a small interactive scene that progresses and changes as you play with it. The landscape and objects change as you encounter an ominous geometry that seems to shape the moons. The game is a vignette game like ISLANDS: Non-Places.

What the prototype ended up as:
The prototype has an interactive menu that acts as a toy; you can hold the left mouse button and drag to spin the moons around the planet and click to stop them spinning. There are only two of the eight levels. In each level, you can click and hold the left mouse button to pan the camera around and click on objects to see how the scenes play out. Both stages are similar in terms of their interactions but have different visual looks to them. The music and sound design play a big part in bringing the world to life and showing the character of each moon.

Thoughts I had during development:
After the initial playable prototype, the world felt very empty. This was when I decided to add a menu scene to give more context to the moons. During the development of the menu, I started adding sound effects and music, the addition of which brought the world to life. So, I went back and added some evolving music to each of the scenes. Originally, I had planned to make more polished art assets, but I found that repeating the few that I had worked well with the added music. Keeping the scene and experience minimal helped explore the potential around vignette games.

Reflections on Play & Deconstruction:
The final prototype reflects my initial intentions better than I expected it to. I noticed that adding even the smallest amount of sound into the world brings it to life more than being able to control an avatar did. Keeping the game so restricted did offer some good insights, but also left the final prototype feeling like a completed game with minimal room for growth.
Vignette games seem to be an interesting area of exploration; my idea of what a vignette game could be is limited to what I made here. There might be more possible directions to go and exploring them in their own way outside of narrative game mechanics might be more beneficial.

Reconstruction:
I've noticed that during the production of the last three games, there comes a point where the game takes on a life of its own. It starts to want to become its own thing, and if there is too much direction, it cannot evolve into an interesting narrative game. The same goes for the prototypes that had too little direction; the game becomes one thing with nowhere else to go. There needs to be a fine balance having a clear direction for the game where it's allowed space to grow but with support to keep growing in interesting ways. One thing I've noticed about the mechanics I've made for the last three games is that the more room for play they offer in themselves; the more space stories must take hold; space doesn't need to be playless.

Appendix 4

Prototype 4 Reflection: Temp Glitch Mechanic

Problem Statement:
Part of the inspiration for this game came from making the music for the other games and research into modular synths. Going back to the first prototype, I think there is still more room for exploration in the working sim style of game. But instead of focusing on serious work, the work will be a toy that distracts from the goals of the game.

Initial Design Goals:
In this game you start work as a temporary glitch mechanic, working in a large open plan office you need to fix glitched each day to earn enough money. Each day you clock in to work with a traditional punch card, sit down at your desk and are given a certain amount of jobs based on what modules you own. As you work through your tasks for the day, it's easy to get distracted with playing with the machines. At the end of each day you earn money equal to the number of jobs you've completed. Punch out of work, go home, sit on your computer, and buy more modules to play with at work. You also need to pay your bills and buy food, but maybe you don't need to eat so much this week, then you can buy that module that's on sale.

What the prototype ended up as:
You can punch in and out of work. Sit at your computer at home, but there's nothing to browse to buy yet. At work the workstation is set up and includes several modules that wouldn't be available at the beginning of the game, they are there to test playfulness of the workstation. There is an oscillator set up with different waveforms, several filters to play with, and an oscilloscope screen to represent the glitches in need of being fixed. There isn't a day/night cycle or money yet.

Thoughts I had during development:
The experiences of playing with this toy are as distracting as I hoped it would be, as I spent some amount of time playing with it instead of working on it myself. The oscilloscope was useful to get an idea of what the glitches could look like and how the controls can change it in such dynamic ways but developing that further to have a specific goal for each job doesn't seem feasible. Also, I gave myself a terrible headache playing the machine, so for the fully realised game, the sound would need to be less jarring as not to give other players headaches.

Reflections on Play & Deconstruction:
The idea of making a toy to subvert the gamist agenda works in part, although playfulness takes over. It might be too distracting then for narrative play to happen. For all these prototypes, I've focused on how narrative game mechanics work in games, but I've yet to use that to tell a story. One assumption I've had throughout these four prototypes is that narrative game mechanics will be enough. If I create interesting mechanics that can convey narrative, the player will piece it together themselves. This isn't exactly true as there should be some story structure. It is authorial expression after all, I'm authoring a story, so that story needs to be somewhat compelling and have structure to help that.

Reconstruction:
There aren't any characters in these prototypes, this is based on my assumption that games can do it all, but stories often focus on characters. I need to change this assumption and use more characters in the next game. Also, using a day/night cycle again for structured play didn't offer anything over simply playing the game, it would be useful to explore the day/night cycle as a narrative mechanic.

The main assumption I need to change is that these stories piece themselves together; they need some guidance and direction to be able to manifest. Narrative game mechanics are how the story is told in games, but it's difficult to know how well they work if the game doesn't tell a story.

Appendix 5

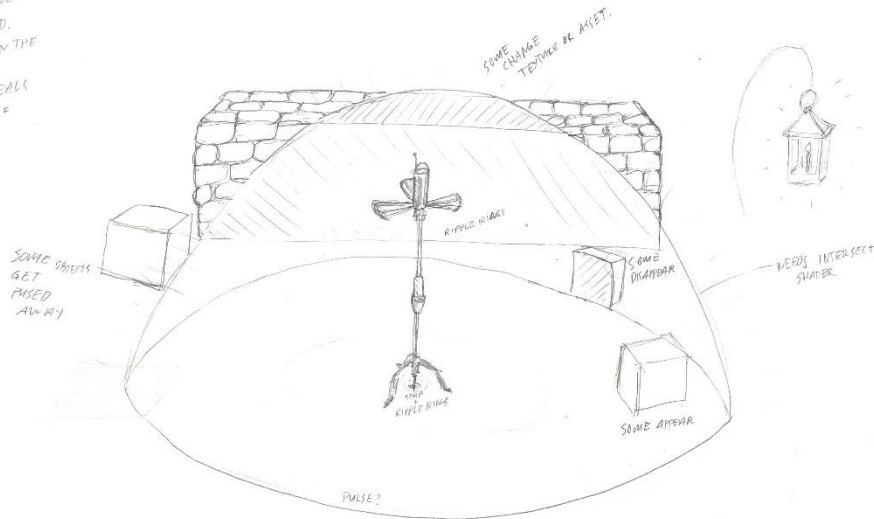Documentation of the game mechanics and beat sheet for *Beacons to Oceans,*
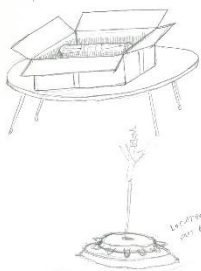
STORY, YOU THOUGHT YOU LOST YOUR DAUGHTER
SAILING, DROWNED. BUT SHE'S ACTUALLY ALIVE AND THE   BEACON
BEACON IS YOUR WAY OF FINDING HER.
YOU DON'T KNOW IT YET. BUT WHEN   LODESTAR STAFF POWERS.
YOU DO, YOU LOSE THE BECON TO....   - PUSH OBJECTS
    AND NEED TO GET IT BACK TO FIND HER.   - TRANSFORM OBJECTS
                    (TWIST SHES A MERMADE) - MAKE THEM DISAPPEAR.
                        NOW...

Beat Sheet

- SOME OBJECTS CAN APPEAR

Opening Image YOUR AT HOME, READING   - SOME OBJECTS CAN APPEAR THE DOORBELL RINGS
IN THE LOUNGE. CLICK, TURN PAGE.   BUT THIS TIME THE DOORBELL RINGS
CLICK, TURN PAGE, AGAIN   A PACKAGE HAS BEEN LEFT FOR YOU.
                            YOU GO INTO THE KITCHEN.
                                OPEN IT.
AND PULL OUT THE GUIDING BEACON, TURN IT ON AND GET TRANSPORTED SOMEWHERE.

Theme Stated SOME GUIDING LIGHT, NOT IN DEATH, MAYBE IN RELATIONS. LOST FOR
WITH POSTCARDS?   SOME REASON.
LIGHT HOUSE?

Set-Up YOU GET THE STAFF
WHICH INTRODUCES THE MAIN MECHANIC, PLANT IT IN THE BEACON
                            GROUND. ~~LIGHT~~ IGNITES.
EXPERIMENT WITH NEW MECHANICS PHASE.

Catalyst INCITING INCIDENT
CALL TO ACTION, LETS GO ON AN ADVENTURE. HOW DO I CALL THIS OUT
                                    THROUGH MECHANICS?
                                    ADDING MECHANICS?
Debate ROAD OF TRIALS   ~~TRAILING?~~
THINGS GO WELL.

Break into Two THIS IS THE BIG CROSS OVER INTO THE OTHER WORLD.
I WANT THE MECHANICS TO BE USED BEFORE THIS, BUT STORY WISE IT
                    SHOULD ~~LEAD~~ DRAW YOU INTO THE
                                OPPOSITE SPACE

B Story LOVE STORY.
SECONDARY STORY.   FIND OUT ABOUT YOUR DAUGHTER.

Fun and Games THIS IS SOMETIMES
THE TRAINING   EXPLORE THE WORLD ~~AND DISCOVER~~
MONTAGE   ~~WILL~~ AND DISCOVER WHERE YOUR DAUGHTER
                                    IS.

Midpoint THE PLAYER FINDS   ~~DISCOVER THE~~
THEMSELVES IN THE SEAFARERS KINGDOM.

Bad Guys Close in

All is Lost THE BECON IS TAKEN AWAY.

Dark Night of the Soul THE NIGHT IS DARKEST BEFORE THE DAWN.
        PUSHED BACK INTO THE IN-BETWEEN WITH
                        OUT THE BEACON.

Break into Three YOUR DAUGHTER SHOWS UP AND SHE HAS THE BEACON.
~~SHE~~ TOGETHER YOU GET OUT AND ARE REUNITED.

WHO ARE THE ANTAGONISTS? THE ANTAGONISTS? THE LAST DETAIL TO DESCRIBE.

Final THE SEAFARERS COME FOR YOUR DAUGHTER, YOU MUST BREAK THE
        BEACON AS YOU ESCAPE.

Final Image NEW EQUILIBRIUM.
            AT HOME WITH YOUR DAUGHTER.

WHEN YOU USE THE BECON MAYBE YOUR TRANSPORTED TO A NAUTICAL
MAGICAL WHIMSY WORLD.
THEY THINK YOUR A WIZARD TRYING TO INVADE. BUT YOUR NOT.
BUT MAYBE THEY ATTACK YOU FOR THIS, AND YOU CAN USE THE BECON TO
PUSH THEM AWAY (LIKE ICO), AND WITH OUT THE STAFF YOU HAVE TO STRUGGLE ALONG