![TÉCNICO LISBOA]

Highlight The Path Not Taken to Add Replay Value to a Storytelling Video Game

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Thesis to obtain the Master of Science Degree in

Information Systems and Computer Engineering

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January 2021

Acknowledgments

I would first like to thank my supervisor, Professor Carlos Martinho, whose expertise was invaluable in formulating the research questions and methodology. Thank you for keeping me in check throughout this project and being always available to provide in insightful feedback which pushed me to bring my work to a higher level.

I would like to thank my friends and colleagues Diogo Almiro, Diogo Tito, Pedro Granja and Ricardo Sousa for their friendship, encouragement and caring over all these years, for always being there for me through thick ant thin. It was their insight, support and sharing of knowledge that has made this Thesis possible.

In addition, I want to thank my parents, Maria de Fátima Gamito and José Gamito, and all my family that helped me grow as a person and were always there for me during the good and bad times in my life. I specially want to thank my sister Patricia Gamito who always kept me company around the house, together with my cat Kika, as well as giving me happy distractions to rest my mind outside of my research. I would also like to thank my grandparents, aunts, uncles and cousins for their understanding and support throughout all these years.

Last but not least, would also like to acknowledge my boyfriend Leandro Faustino for pushing me to work when I didn't always feel like it and always being a place to vent when I felt stressed to get the project done.

To each and every one of you – Thank you.

Abstract

Branching narratives are a format of interactive storytelling in video games which presents players with challenges that can be completed in a number of different sequences. These challenges are presented by moments of decisions for the player to make, but it is only after the consequences of the players' choices are delivered that the players get a chance to reflect upon them. It is through actions and inactions that feelings of regret are created within the player which in turn makes them want to replay the game. Traditionally, video games tend to focus less on the inactions of the players, leaving players unaware of all the possible branches within the narrative. Therefore, they do not appreciate the video game in its entirety. This study aims to test the possibility of conveying more replay value to a video game by giving feedback to the players about their inactions. Through a study of storytelling techniques and regret psychology, a narrative text-based game was created with a system which generates feedback to both actions and inactions of the players. To test the hypothesis, a structured evaluation was conducted with 64 participants who played the narrative and answered a short questionnaire. Participants were divided in two group where one group played the narrative with the feedback system, and the other group without. By comparing both systems, results showed the feedback of inaction had an impact on the affective reaction from the players. The feedback also showed a greater number of replays from players who normally do not usually play again, and less challenge from the players who do. Concluding that highlighting the path not taken improved the game experience without creating remorse, but instead by showing them what could have happened, increasing the replay value.

Keywords

Replayability; Storytelling; Branching Narratives; Inaction; Consequence.

Resumo

Narrativas ramificadas são um formato de narrativa interativa em videogames que apresenta aos jogadores desafios que podem ser concluídos em várias sequências diferentes. Eles são apresentados como momentos de decisões para o jogador tomar, no entanto, somente depois de serem mostradas as consequências delas é que os jogadores eles têm a chance de refletir sobre elas. É através de ações e inações que o sentimento de arrependimento é criado no jogador, o que o faz querer jogar o jogo novamente. Embora, tradicionalmente, os videojogos tendem a não concentrar muito nas inações dos jogadores, deixando os jogadores ignorantes face a todas as ramificações possíveis dentro da narrativa. Acabando então por não apreciar o videogame na sua totalidade. Este estudo tem como objetivo então testar a possibilidade de transmitir um maior *replay value* a um videojogo, dando *feedback* aos jogadores sobre suas inações. Após uma pesquisa na área do *storytelling* e psicologia do arrependimento, foi criado um jogo *text-based* narrativo com geração de *feedback* para as ações e inações dos jogadores. Com o fim de testar a hipótese, foi realizada um estudo com 64 participantes que jogaram a narrativa e responderam a um pequeno questionário. Os participantes foram divididos em dois grupos, onde um grupo jogou a narrativa com o sistema de geração de *feedback*, e o outro grupo sem. Comparando os sistemas, os resultados mostraram uma forte correlação entre o *feedback* e um aumento da reação afetiva dos jogadores. O *feedback* também apresentou um maior número de *replays* de jogadores que normalmente não costumam jogar novamente, e menos desafio por parte dos jogadores que o costumam. Concluindo que destacar o caminho não escolhido melhorou a experiência de jogo sem criar remorso, mas sim mostrando o que poderia ter acontecido, aumentando entãoo *replay value*.

Palavras Chave

Rejogabilidade; Narrativa; Ramificação; Inação; Consequência.

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Acronyms

AFS   Andrew File System

AI   Artificial Intelligence

AIIDE   Artificial Intelligence and Interactive Digital Entertainment

CSS   Cascading Style Sheets

GEQ   Game Experience Questionnaire

HTML   Hypertext Markup Language

ICIDS   International Conference on Interactive Digital Storytelling

IEQ   Immersive Experience Questionnaire

IF   Interactive Fiction

IST   Instituto Superior Técnico

NLP   Natural Language Processing

NPC   Non-Playable Character

PC   Playable Character

PENS   Player Experience of Need Satisfaction

RegEx   Regular Expression

RDS   Regret and Disappointment Scale

RPG   Role-Playing Video Game

SSH   Secure Shell

1

Introduction

Contents

In this Section, I will be discussing the main problem of my project with the planning of its fix and the outline of the document.

1.1 Motivation

Replayability has been a huge factor for the storytelling of most non-linear story-oriented video games. In this type of interactivity, the narration of the story constantly presents choices the player has to make in order to progress through the game as the plot unfolds, plus these choices have further consequences on the game. As a result, the player's actions during the game have direct influence on the ending of the story, for it is possible for a game like this to have multiple endings. A good example of this is The Stanley Parable[1] (Figure 1.1) where the narrator comments on every action the player takes, which has 19 possible endings.

Figure 1.1: Narration of Choices in The Stanley Parable (2013).

Therefore, the decisions the players chose to take during one playthrough only allows to see the outcome of one of all possible endings, leaving the other ones unexplored. This is where replayability comes into place, in order for the players to know the other possible endings and fully experience all of the game, they have to replay the game multiple times and make different choices each time around. Although this can be a very unique way of storytelling, the players might not always know all the possible options and branches the story of the game can take. Normally the game presents the main options the players can take, then they proceed to make a decision which the storyline in return adjusts itself to that action showing the players its consequences. But is not very clear what could have happened had the players chosen to take other actions. The players are not aware of the consequences of not choosing said action and what impact it could have had in story branching, knowing the game could

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[1]Galactic Cafe. (2013) The Stanley Parable. Galactic Cafe.

have changed is not very clear using this type of approach. Then, if that does not happen, then there will be a great loss in resources the company had to put into making the game only for it to not be fully experienced. So, there must be a way to minimize this loss and appeal the players to replay the game by letting them know there are other possible outcomes. But this needs to be done correctly, because the players otherwise might need to go outside the game to find out about the decisions they did not take, for example reading about it in a wiki fan page, completely ruining the experience with spoilers.

1.2   Problem

The players don't always know the full set of options and ramifications the storyline can take during a playthrough of a game since it usually only gives feedback about the decisions and actions the players took, leaving those other options and a great part of the game unexplored, potentially leading to a waste of resources and a decrease on the replay value of the game. And so, the main question arises: **How to motivate the players to replay the video game to explore different choices and experience alternative branches of the narrative?**

1.3   Hypothesis

Having that question presented, I hope to provide an answer to it with the following hypothesis: **Does showing the consequences and/or leaving subtle hints on the actions and decisions the players don't take on top of the ones they take by suggesting they could have taken a different path add replay value?** This hypothesis has two parts. The first part (H1) is making a mechanism that triggers feedback to the players whenever an action becomes unavailable, for example, the players are at a bar and don't interact with a cup provided to them, the players hear the cup falling to the ground. This type of feedback makes the players aware that we could have done something we did not do, in this case drink from the cup. The second part of the hypothesis (H2) is about showing the consequences of the players inaction trough the feeling of regret making them even more conscious about the importance of their actions. Let's say, in the same example, beyond hearing the cup falling, the waiter who is passing by cuts herself in the broken glass.

In order to explore this problem, I aim to develop a short story-oriented game with multiple decision moments, leading the players to different outcomes by providing feedback about consequences of the actions and inactions on those moments. This solution was modelled by a directed graph where each possible action presented by the storyline was represented by a node in said graph, the players at any given time in the game had a number of actions/nodes available for him/her to pursue, revealing its outcome and effect in the world. The option the players do not choose is considered as an inaction, and

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for every inaction there will be also a consequence, the impact of not choosing that path in the narrative. Choosing certain nodes/actions will unlock new nodes/actions.

Feedback was generated for every inaction the players took with the aim of creating more desire for the players to replay the game again and make them explore other outcomes the game as to offer other than the one they got in their first playthrough. The feedback was composed by storytelling elements used to generate feelings of regret in the players towards the actions they did not take.

1.4 Objectives

The following items represent the objectives I considered for this project:

- Create a short narrative storyline that is both interesting while clearly demonstrative of a scenario where there are multiple possible actions the players can take, and whether those actions make a significant impact in the world, so the players feels they are responsible for pushing the story forward, while having multiple possible endings;

- Model this narrative in a graph structure in order to establish relations and dependencies between the possible actions in the game and its consequences in the world by using time constraints;

- Strategically generate different feedback for the inactions with the intention of giving hints about having other branches in the storyline;

- Apply this model on a text-based interactive system with the premise of testing the hypothesis;

- Run a small test of the narrative with the feedback with a small group of people to have a general sense of the responses and adjust the narrative accordingly;

- Create a second version of the model but in a more standard way of following the storyline by removing the notion of inaction and the given feedback;

- Testing both models with a wide audience by carefully analyzing their emotions and willingness to replay the game afterwards;

- Comparing the results from the players by analyzing the gathered data to reach a conclusion.

1.5 Outline

This thesis is is organized as follows: Chapter 1 I discuss the problem. In Chapter 2, I will be elaborating on some key aspects regarding the importance of storytelling in video games and presenting the current state of the art of story oriented video games. In Chapter 3, I discuss the methods detailing

the implementation of my proposed model and its architecture, after which the result are presented and discussed in Chapter 4 alongside with the evaluation procedures. Finally, Chapter 5 outlines the main conclusions and identifies both limitations to the study and recommendations for further research.

2

Related Work

Contents

In this chapter, I will be introducing and discussing some concepts that helped me understand my problem and bring my project to life. I will start off with the state of the art of the storytelling and branching narratives fields, introducing some important terms to get familiar with them. I will then get in detail with the definition of action and inaction, since they are a great part of choices in branching narratives and their impact on regret theory. Finally I will address the player experience and storytelling system to help me develop my own.

2.1 Video Games

Video game is a term used to describe a form of electronic interactivity that provides entertainment and whether it also should be considered as a form of art has been increasingly a matter of contention [1]. This term encompasses a wide variety of genres, there are so many factors that contribute to the experience of playing a video game that the fact we classify *Dark Souls*[1] and *SimCity*[2] as the same thing is astonishing (Figure 2.1).

Figure 2.1: Dark Souls: Remastered (2018) an action Role-Playing Video Game (RPG) game to the left and Sim City 3000 (1999) a city simulator game to the right.

The worth of a video game is generally different from person to person being that some might prefer to play something fast paced while others might prefer something more casual, but it is generally defined by some key components that enrich the overall experience.

Since video games involve interactivity for the user, it provides a fun and social form of entertainment. It encourage teamwork and cooperation when played with others, but stimulate creativity and imagination when playing alone. Single-player video games might not be the biggest trend currently such as *Fortnite*[3], but still are the core of many fans favorite video game genre to play. Overall, single-player video games provide a much more immersive experience, with hours on end invested into it.

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[1]FromSoftware, QLOC and Virtuos. (2018) Dark Souls: Remastered. Namco Bandai Games.
[2]Maxis. (1999) SimCity 3000. Eletronic Arts.
[3]Epic Games and People Can Fly. (2017) Fortnite. Epic Games.
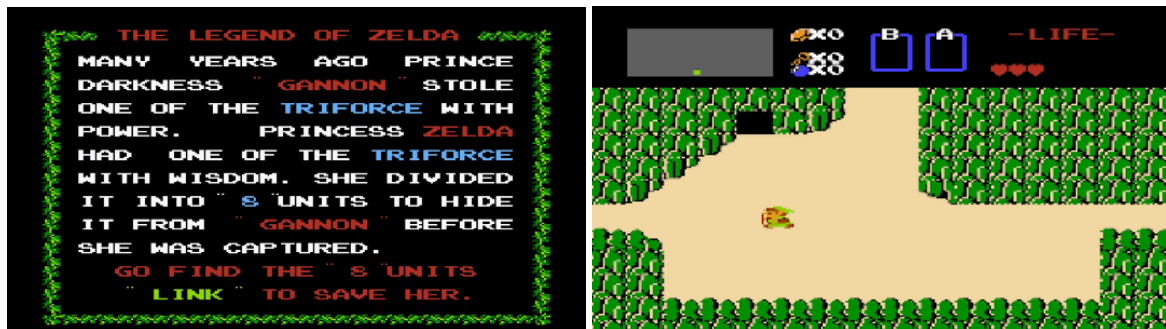
Figure 2.2: Intro of The Legend of Zelda (1986) with the story line on the left followed by the actual gameplay of the game on the right.

2.2 The Importance of Storytelling

The overall gameplay and the game mechanics are the core of any video game, it is the specific way the players interact with the game. But storytelling is, also, a key factor, and to make a game memorable they need to coexist in harmony. It gives purpose for the players to start the game and gets them going to finish the game while having an amazing experience. Even the simplest games have a story that supports the game mechanics, for example, we have *Super Mario*[4], a franchise that has 200 titles since 1985 and has sold over 330 million copies all over the globe has a very simple, straight forward plot with the following premise "Princess Peach was kidnapped, go save her". And *Nintendo* games thrive well with the simplest stories with the basic reasons for it to happen but are great in their execution.

It is difficult for the players to continue the game when the gameplay is prioritized leaving the storyline disregarded. For example, the typical "fetch quest" side quests of many RPG (*role-playing-games*), where the players are asked by the "quest giver" to go pick up an item of which the details are unimportant to the plot. This kind of quests are often used to pad out the length of the game, giving players some illusion of value and making the game boring and predictable. Alternatively, we can prioritize the storyline and use the gameplay as means to explore it and not the other way around. Many games have been successful at doing this, for example *Heavy Rain*[5] and *Telltale Games*[6] that are good examples of story-oriented games where they integrate the story and dialogue sections within the gameplay segments like actions sequences as to not break immersion while still being fun.

Video games are one of the best forms of storytelling. In the beginning of video games, the game would start off with an initial text describing the main plot of the game just to set the players off in an adventure and play the game with no further interruptions, for example the very first *The Legend of Zelda*[7] (Figure 2.2).

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[4]Nintendo EAD and Nintendo EPD. (1985) Super Mario. Nintendo.
[5]Quantic Dream. (2010) Heavy Rain. Sony Computer Entertainment.
[6]D. Connor, K. Bruner and T. Molander. (2004) Telltale Games.
[7]Nintendo EAD. (1986) The Legend of Zelda. Nintendo.

Figure 2.3: Thoughtful choice about the future of two characters in Mass Effect (2007).

But now, video games are being compared to movie experiences, where the players get to sit back and enjoy a well written story where they can get to be the main protagonist and experience storytelling in a completely different level. For example, *Life Is Strange*[8] is a graphic adventure game which main gameplay mechanics evolve around this powerful story where dialogue exchanges can be rewound while branching options are used for conversation.

2.3   Choices and Consequences

When we are talking about a story-oriented game with multiple branches in the storyline, decision making is a crucial aspect that needs to be implemented in the experience of the game. Games give players the agency to make decisions, but whether they highlight choices in advance or deliver consequences after the fact changes the experience and the game design itself. Choice in videos games is one, about the challenges of identifying and making the correct decision, and two, about having enough interesting choices the players can make [2]. These choices are the ones that influence the storyline and push character development by making the players reflect on what they are about to do as they do it, as the outcome of their decision is already known beforehand. Video games provide a context where players can have their ethics and personal beliefs questioned with moral dilemmas. This is achieved by placing players in scenarios they could potentially experience in real life but would rather not do. For example, in the *Mass Effect*[9] trilogy, the players are always presented with hard choices for them to make, namely in the first Mass Effect, Captain Sheppard has to make a choice whether to save one character or the other (Figure 2.3). And since the players weigh all of those things before they press the button, it's clearly a choice.

On the other hand, games about consequences are about making the players realize the impact their

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[8]Square Enix. (2015) Life Is Strange. Dontnod Entertainment.
[9]BioWare. (2007) Mass Effect. Microsoft Game Studios.

actions have after they made those actions. Of course, they have choices as well, but the emphasis is not on the players need to stop and ponder on as they make them. Instead, it is only after their consequences are shown that there is a reason to reflect about them.

Although both games about choice and consequences are interesting, giving room for the players to learn something new about themselves and their personal values, they have different effects on the game experience as each one requires a different approach to game design. In my case, I will be exploring more in depth the games about consequences, on revealing to the players the effects of their actions and inactions as means to stimulate the players to replay the game. And, as a game designer there must be a careful thought about the manner that reveal is being presented, because simply punishing the players, or showing off the actions they made had bad results, does not necessarily get the point across. Instead, it is important to understand the chain of causality that runs from the initial action the players take, to the results it is intended on showing them, while acknowledging what the chain says about the world. It is also vital to ponder on what the players think about that result. Normally the purpose of this consequences is to create an emotional reaction, while at the same time we don't want to completely repel the players from the experience. If there is no attention, the players might feel the game is cheating on them by delivering an outcome they did not like or intended, an outcome they feel like they did not really have any control over. Nevertheless, if it's done right, it is possible to get the players to ponder actions that they otherwise would had simply taken without thinking it over, causing them to question some of their moral beliefs. The *Dragon Age*[10] series is a good example of this type of approach with its approval mechanism for party members, where most of the players decisions and behavior throughout the game has impact on the way the companions like the protagonist, causing them to leave the party in case they highly disapprove those actions (Figure 2.4).

2.4   Action and Inaction Effect in Regret

There is a great difference between the decisions to act (i.e., actions) and the decisions not to act (i.e., inactions). Action and inaction are complex terms that go by many names and have many different and sometimes conflicting interpretations that may result in inconsistent and unclear findings. These terms are often used in the study of psychology to describe goals, attitudes, and behavior to better understand action and inaction and their role in human psyche and behavior [3–5]. One might not consider inaction as a deliberate conscious decision, but it has in fact impact in the world and consequences and can be seen as even more intentional than action. For example, inactions could be deliberate conscious decisions to do nothing by means of exerting self-control to inhibit emotional reactions and automatic responses, whereas action decisions could reflect impulsiveness, adherence or primed action, rather

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[10] BioWare. (2009) Dragon Age: Origins. Electronic Arts.

Figure 2.4: Consequences of the players actions on the approval of the companions on Dragon Age: Origins (2009).

than a deliberate conscious self-directed action [6].

Action-inaction is commonly referenced to blame or negative emotions such as regret. These have been shown to be important in many aspects of life, including but not limited to decision-making [7–9], self-regulation, well-being, and health [10–12].

2.4.1 Action effect

The *action effect* [13] is the phenomenon that people tend to feel greater regret over negative outcomes if they are a result of action compared to inaction. This effect was first demonstrated by comparing the decision made by two inventors, Paul and George, to a group of participants:

- Paul owns shares in company A. During the past year he considered switching to stock in company B, but he decided against it. He now finds out that he would have been better off by $1,200 if he had switched to the stock of company B. George owned shares in company B. During the past year he switched to stock in company A. He now finds out that he would have been better off by $1,200 if he had kept his stock in Company B. Who feels more regret? [13]

In this scenario, both decisions lead to a loss of an equivalent amount of money. Yet, readers of this scenarios concluded that the person who acted, in this case, George, would feel more regret than the person who refused to act, in this case, when people experience a negative event, they value and regret action more than inaction, calling it the *action effect*. These findings are also consistent with the notion that people find it easier to monitor action rather than to monitor inaction. Research on morality has similarly shown that, when the possibility of a negative outcome exists, people prefer harm by omission

over harm by command, this is, they rather withhold the truth rather than lying [14, 15]. This pattern may occur because of the *action principle of harm* [16, 17] which is, people consider harm produced by an action more immoral than harm produced by an inaction.

2.4.2 Inaction Effect

Although this previous concept shows that actions produce more regret than inactions, other researchers [18] concluded that concept was based on decisions made in isolation and ignored that decisions are often made in response to earlier outcomes and the information about a prior outcome was manipulated. Being that, they defended that when prior outcomes were positive or absent, people attributed more regret to action than to inaction. However, as predicted and counter to previous research, following negative prior outcomes, more regret was attributed to inaction, a finding that the authors [18] concluded label the *inaction effect*.

2.4.3 Temporal Distance

Temporal distance [19], suggesting that *action-effect* is weakened and even re-versed over time to wistful nostalgia of experiencing stronger regret for inactions in the past [20]. An important related underlying difference not clearly mentioned in the debate regarding temporal distance is that immediate actions are clearer and more specific, whereas actions in the far past seem broader, more abstract, and less clear. Therefore, temporal distance changes the way people perceive and think of actions and inactions [6].

2.4.4 Regret

According to *regret theory* [21, 22], regret is a counterfactual emotion that stems from a comparison between what is and what might have been. However, not every "might have been" is supposed to produce regret. Regret is assumed to originate from comparisons between a factual out-come and an outcome that might have been had one chosen another action. Because one could have prevented the occurrence of the negative outcome by choosing something different, regret is related to a sense of responsibility for the outcome [18]. Regret has been described as a "comparison-based emotion of self-blame, experienced when people realize or imagine that their present situation would have been better had they decided differently in the past" [9].

This emotion is a big factor in the players experience especially when the players have moments of decision through action and inaction. Ultimately, it leads the players wanting to go back on some of their choices during the play-through and replay the game in a way they feel better about the outcome of it. The big question is, when do they feel more likely to do so, and how does that influence the gameplay of the game.

2.5 Save Scumming

Save scumming is the practice of the players saving the game during the play-through just before making a risky move and then reloading it until the players get exactly the outcome they want. This term comes from the *Roguelike*[11] community, which has long frowned on the practice and thus categorized save/reload as one of the many forms of "scummy" behavior honorable players eschew. Most *roguelike* games prevent this by erasing a save file as soon as you load it, however, this puts the players' entire game at risk in the event of a crash. Some players decry it while other players defend its inevitability and embrace it, there are many approaches to design video games around it.

The type of games that encourage this type of behavior have some of the following in some degree: randomness or hidden information which makes it possible to change the outcome of an action if the players reload their save, an incentive for them to do such as better rewards or better clear times, and, events the players might want to try multiple times. Such as if a game has multiple endings with identifiable branching points. Not all games with several endings have new game slot as an option, and even if they do, sometimes you just do not want to run through the entire game for the sake of another ending. Saving before the branching points lets you go back through from where it twisted at your convenience.

The best way to keep players from save scumming is restricting when they can save. Having a well-designed save system creates an environment where players can reload the game over and over without ruining the game experience and engagement. This means having a robust and frequent auto-save system with restore points which takes the control of saving and reloading from the players while giving them a non-frustrating place for them to restart from. Another way of designing around save scumming is actually to join forces with it. A good example of this is *Undertale*[12] , which made this process enjoyable by changing the dialogue of characters every time the players reloaded a save in order to change the outcome of an event, as we can see in Figure 2.5. Another example is the visual novel *Doki Doki Literature Club!*[13], which uses a contrary approach where the players need to manually delete some specific game files in order to change the events of the playthrough.

2.6 Interactive Storytelling Systems

Interactive storytelling systems tell a story while allowing the players, who are controlling the character, to make changes to the world around them. It is a form of digital entertainment in which the storyline is not predetermined. The author creates the setting, characters, and situation which the narrative must ad-

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[11]*Roguelike* - subgenre of RPG characterized by a dungeon crawl through procedurally generated levels.
[12]Toby Fox. (2015) Undertale. 8-4, Ltd.
[13]Team Salvato. (2017) Doki Doki Literature Club!. Team Salvato.

Figure 2.5: Undertale (2015) calling the players out on save scumming.

dress. The architecture of an interactive storytelling system includes a drama manager, user model, and agent model to control, respectively, aspects of narrative production, players uniqueness, and character knowledge and behavior [23]. The field of study surrounding interactive storytelling encompasses many different fields, including psychology, sociology, computer science, among others, which all are part of the term Human-Computer Interaction (HCI), at the intersection of hard science and the humanities [23].

Next I will be listing some systems for digital interactive storytelling in video games and how they tell a story.

2.6.1 Text-Based

A text-based game is video game or digital artwork whereby information is conveyed as encoded text in the user interface and the players interact with it primarily through text as well. This type of format is normally associated to the term Interactive Fiction (IF) which originated in the 1980's when parser-driven text adventure games, such as *Zork*[14] and the rest of *Infocom's* canon, defined home-computer entertainment (Figure 2.6).

After a quarter century, interactive fiction now comprises a broad and sparkling variety of work, from puzzle-laden text adventures to sprawling and introspective hyper texts. Despite the lack of commercial support, the availability of high-quality tools allowed enthusiasts of the genre to develop new high-quality games. Competitions such as the annual *Interactive Fiction Competition*[15] for short works, the *Spring Thing*[16] for longer works, and the *XYZZY Awards*[17] , further helped to improve the quality and complexity of the games.

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[14]Infocom. (1977) Zork. Personal Software, Infocom and Activision.
[15]Interactive Fiction Competition Homepage, https://ifcomp.org/
[16]The Spring Thing Homepage, https://www.springthing.net/
[17]XYZZY Awards Homepage, https://xyzzyawards.org/
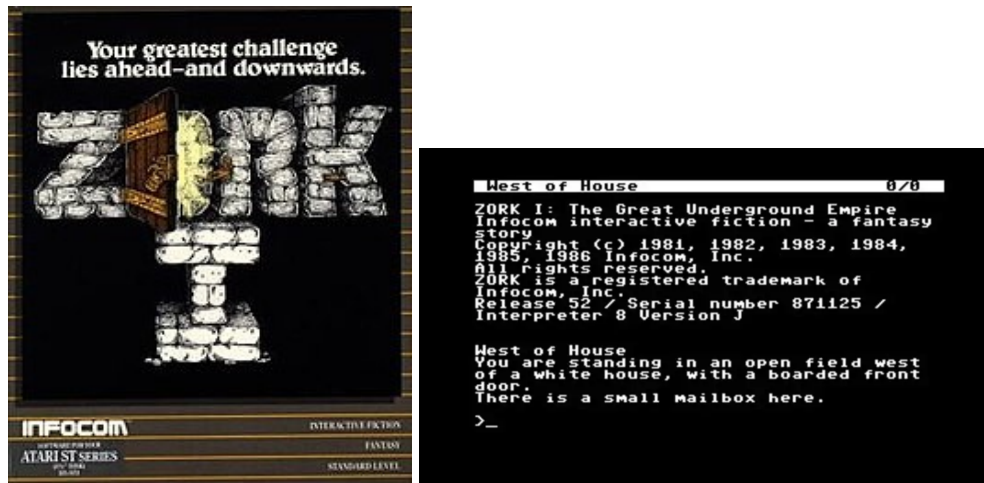
Figure 2.6: Zork (1977) is especially rich game, in terms of both the quality of the storytelling and the sophistication of its text parser.

2.6.2 Cutscenes

It's often considered ideal for gameplay and storytelling to go hand in hand. It can be difficult for a 3D video game to convey the events of the plot to the player, and the traditional approach to this is normally through a cutscene. A cutscene is a sequence of animations in a video game that is not interactive, for example, the player is playing the game shooting at enemies and, suddenly, there is an unescapable cutscene. There are two problems with this approach, and they both have to deal with immersion. One is when they interrupt the experience of the game the players are playing, it starts to feel like an obstruction or as if it's been added on top of an already existing game. The other problem is related to the graphics of the game, when during the cutscene the game looks amazing with perfectly rendered graphics, and as soon as the cutscene ends and the players go back to the gameplay, the graphics change tremendously, breaking away the immersion. Cutscenes are usually manifested in the following formula: level 1, cutscene, level 2, cutscene, etc.

That is why it is good idea to try to incorporate the story into other aspects of the game design. Such as integrating the story and dialogue within the gameplay segments, where the dialogue and objectives are cleverly woven into the plot. A good example of this is the *Uncharted*[18] series, where there are still cutscenes, but only for the important story developments. Then for the character-building moments or the exciting action sequences, the players get to play that. Also, for text-based games allow players to imagine the narrative elements in their head as they read to the passages.

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[18]Naughty Dog. (2016) Uncharted 4: A Thief's End. Sony Computer Entertainment.
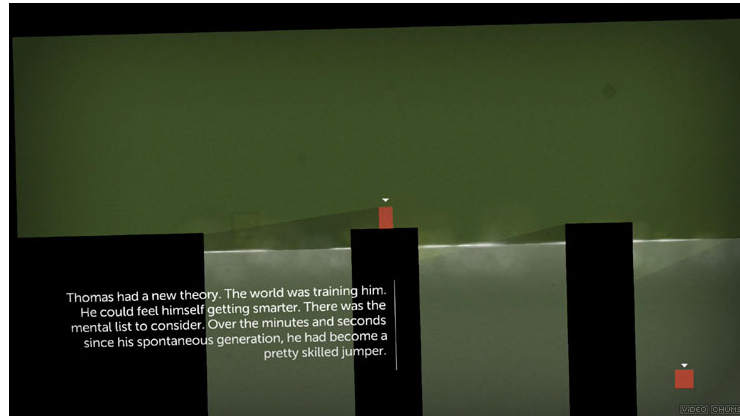
Figure 2.7: Narration of Thomas Was Alone (2012).

2.6.3 Narrator

One of the best ways of telling a story is just by telling it, with a narrator commenting on the players actions as they go along. A good example of this is *Thomas Was Alone*[19] where the narrator of the video game tells a story of a group of colored rectangles on a journey to find purpose and it does so in past tense (Figure 2.7). This makes for a very linear way of giving the narrative to the players where they can sit back and let the story unfold as they go along. The narrator tells the story from Thomas point of view while sometimes informs the players about what the other characters are thinking and feeling, all being Playable Character (PC)'s. This is a direct way of storytelling which allows Mike Bithell, single-man studio, to communicate emotion using very simple visual elements. It is a good example on how even colored rectangles give way to an interesting storytelling. *Supergiant Games* also feature dynamic voice-overs from a narrator in their games, especially their widely praised video game *Bastion*[20].

On the other hand, there are other non-linear narratives in which the narrator has to follow through the players' choices. As mentioned before, a great example of this is *The Stanley Parable* [1]. This game is in no way linear and this is where the writing of the game excels, because no matter what the players choose, the narrator has always an opinion about it. This gives a sense the players are breaking the rules of the game when they are faced between two choices and chose one (enter the door on the right) when the narrator explicitly tells them go for the other ("He entered the door on his left."). The game is filled with this type contradictions that are served both to confuse the players and create a very surreal experience of playing the game and telling the story.

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[19] M. Bithell. (2012) Thomas Was Alone. M. Bithell.
[20] Supergiant Games. (2011) Bastion. Warner Bros. Interactive Entertainment.

Figure 2.8: "PICK UP THAT CAN!" Storytelling in Half-Life 2 (2004).

2.6.4 First Person

There is a great importance in the perspective when playing a video game, especially when telling a story. Experiencing the game in first-person can let the players see the story trough another person's point of view. A good example of this is *Half-Life 2*[21]. The game gives way almost no information about the protagonist story making it easier for the players to step into his shoes as he is completely silent during the gameplay is a way of removing him of personality. Also, the first-person point of view is never broken in the game much like real life, this removes any boundaries between the players and the game. The game does not tell the players what to do, instead it places them and lets them figure it out by themselves what to make of it by analyzing the world around them. There is good example of this, which is mentioned in an article written by Jake Shapiro (2012)[22] , where a cop stops the protagonist while deliberately knocking down a can of soda and then orders him to pick it up, if the players refuse, the cop will fight the protagonist (Figure 2.8). This shows one of the key features of the story of the game, which is, people are being terrorized to follow orders when the game makes the players think that picking up the can of soda is a free choice.

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[21]Valve. (2004) Half-Life 2. Valve.

[22]JakeShapiro. (2012) "PICK UP THAT CAN!" Storytelling in Half-Life 2 https://www.gamasutra.com/blogs/JakeShapiro/20121025/180169/

2.6.5   Artificial Intelligence Based Interactive Story

Façade[23] is one of the most successful and influential interactive storytelling systems, which puts the players in the role of a close friend of Trip and Grace, a couple who recently invited the players to their New York City apartment for cocktails. This pleasant gathering, however, is somewhat damaged by the clear domestic confrontation between Grace and Trip upon the players' entry. Making full use of the incorporated language processing software, *Façade* allows the players to type sentences to "speak" with the couple and interact with them (or by doing nothing), the players can stop them from breaking up, inflict further harm into their relationship, or even be kicked out of their apartment. This game makes use of Artificial Intelligence (AI) modules that responded to written commands from the user, after these were analyzed by an internal Natural Language Processing (NLP) system. But as is common in the area of NLP, the proper interpretation of words by these kinds of systems is very likely to fail, which is mostly due to various types of language ambiguity [24]. Due to this, *Façade* is famous for its unpredictable understanding of the written inputs of the players, often resulting in confusing events, which lead to a loss of immersion on the part of the players.

2.7   Player Emotions

Flow, presence, engagement, immersion, and fun are amongst most commonly used terms to describe the players' experience when playing digital games. When analyzing the players' emotions and willingness to play the game it is often re-sorted to use questionnaires as a useful standardized research instruments that allow quantification of the subjective experience under consideration, while being relatively easy to deploy. Some of the most widely known and used questionnaires in game evaluation are the Immersive Experience Questionnaire (IEQ) [25], the Game Experience Questionnaire (GEQ), and the Player Experience of Need Satisfaction (PENS). IEQ aims to measure cognitive involvement, emotional involvement, real world dissociation, challenge and control [26]. GEQ measures absorption, flow, presence and immersion [27]. PENS in addition to immersion also measures competence, autonomy, relatedness and controls [28]. In Figure 2.9, we can see the evaluation of the players emotions after the playtesting, with special attention to feelings of regret [29].

In addition to these questionnaires, there is a method to differentiate between the emotions of regret and disappointment, the Regret and Disappointment Scale Regret and Disappointment Scale (RDS) [**?**], for assessing the two emotions in decision making research. The RDS (see Figure 2.10) therefore assesses the two dimensions of a negative emotional experience, by measuring the intensity of the affective reaction and then categorizing the type of emotion experienced based on the cognitive antecedents of regret and disappointment.

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[23]Procedural Arts. (2005) Façade. Procedural Arts.

5. GEQ – post-game module

Please indicate how you felt after you finished playing the game for each of the items, on the following scale:

not at all	slightly	moderately	fairly	Extremely
0	1	2	3	4
< >	< >	< >	< >	< >

1   I felt revived

2   I felt bad

3   I found it hard to get back to reality

4   I felt guilty

5   It felt like a victory

6   I found it a waste of time

7   I felt energised

8   I felt satisfied

9   I felt disoriented

10   I felt exhausted

11   I felt that I could have done more useful things

12   I felt powerful

13   I felt weary

14   I felt regret

15   I felt ashamed

16   I felt proud

17   I had a sense that I had returned from a journey

Figure 2.9: Post-game module in Game Experience Questionnaire

	Questionnaire Item	Description
1	I am sorry about what happened to me	Affective reaction
2	I wish I had made a different choice	Regret counterfactual
3	I wish the events that were beyond my control had happened differently	Disappointment counterfactual
4	I feel responsible for what happened to me	Internal attribution
5	The events that were beyond my control are the cause of what happened to me	External attribution
6	I am satisfied about what happened to me	Control item
7	Things would have gone better if… I had chosen differently. The course of events had been different.	Choice between counterfactuals

Figure 2.10: Composition of the RDS.

2.8   Discussion

This chapter of the document refers to all of the knowledge needed in order to complete my project. Mainly, gathering information about the different components need to make a video game, paying close attention to the storytelling aspect and narrative, since this research is dedicated to storytelling video games with branching narratives.

Deconstructing the choices and consequences presented to the players in those video games was important to take in consideration, because there are a big part when developing a branching narrative. Namely, how they respond to both their actions and inactions in those moments, what's their effect on people and how regret shifts. Translating that to video games, is the act of save scumming which is how regret manifests in players, which I took into account when implementing my solution.

Last but not least, I explored storytelling systems and methods by listing some examples which inspired me for my own system. Then, exploring how to evaluated players emotion in those systems by following by example.

3

Implementation

Contents

In this third chapter of the document, I describe my main work hypothesis: motivating the players towards replaying a branching narrative and, using a storytelling consequence system model specifically developed for this project, generating feedback for the actions and inactions of the players by appealing to the players emotions of regret. In the following sections, I will be detailing how I've implemented each of these elements in detail.

3.1 Approach

With the aim of knowing if my hypothesis works there is no better way other than to test it in a real game scenario so the players can play it and give feedback about their emotions. I approached this problem in a practical way to get direct results. My approach to the problem is structured in five stages. Creating a narrative, implementing storytelling system with feedback for the actions and inactions, development of two versions of game with the narrative incorporated in the system with and without the inactions, testing both versions with the public, analyzing the data and drawing my final conclusions.

3.1.1 Narrative Approach

First stage was designing my own narrative with a focus on the storytelling aspect. Describing a short scenario where multiple activities take place so as to provide multiple actions and decisions the players can make. For example, a busy tavern where there are various Non-Playable Character (NPC)'s with different agendas and where an adventure can unfold. This short story should not take too long to tell, even though it should diverge in multiple branches resulting on a more horizontal story graph rather than a vertical one. It is important to make the players feel they are pushing the story forward and that they are in control of their own actions.

There are countless ways to approach narrative creation, but it all comes down to engaging the audience in an story they feel they have an impact on, as individuals they need to feel they are in control of telling their own stories. This can be done by having a clear outline of the course of the story, a consistent theme and not getting loss in the endless possible choices. For a branching narrative focus needed to be taken on important decisions, which creates multiple branches in the narrative, but at the same time not forget about less important decisions that need to be presented to the player in between those important decisions, as to not interfere with the players notion of agency. Whereas, otherwise, the player would know that every single decision taken would change the path of the narrative, making the feedback needless. This decisions considered "less important" constitute as factors for exploration and storytelling (e.g., walking around the space, looking at some painting or getting to know a certain NPC background). Dialog is also a big component when building a narrative, for each NPC has its unique motivation and personality. It is through dialog that the story unfolds and it is also a great way to convey

consequences of their decisions.

3.1.1.A   The Story: "The Ballad Of The Wizard and Sacrifice"

For the narrative, I opted to write my own, where I would be able to adapt it to the problem and the generation of feedback and regret. The full narrative can be found at the end of the document on Appendix A. In Figure 3.1 we can see the home page and beginning of the narrative with its name, "The Ballad Of The Wizard and Sacrifice", and I will now present the synopsis.

The narrative created is based on the fictional land of Fricraft, in the medieval times, where some strange things have come to happen. The narrative first starts at the local tavern, called "The Ballad Of The Wizard and Sacrifice", where the protagonist, a famous bard, usually plays at. While the bard (protagonist) is giving his/her performance something unusual happens, despite the bard's effort, no sound his coming out. It is later found out that, this is a deed of an evil wizard who is slowly removing all sound from the realm. It is up to the player figure out what really is going on and how to stop it.

To accomplish that, the bard has to go on an adventure and explore. This adventure depends on whom the players decides to join with when at the tavern. There he/she gets to meet another group of bards, the infamous "The Rolling Boulders", who mock the player and a sad fisherman who is looking for his lover. If the player decides to join "The Rolling Boulders", they find themselves in an adventurer in a mountain, here there is an encounter with a magical creature who holds captive the local music box builder, Bob. On the other hand, if the player decides to join the fisherman, they head towards the shore where he last saw his lover. There is also an encounter, but this time with a group of mermaids who are also looking for their sister. In either situation, the players has to figure out how to approach these encounters.

Later, if the player managed to survive those situations, he/she gets to meet the evil wizard who apparently has a very goofy voice. Because of that, he plans to remove all sounds has a form of revenge. By exploring, the player founds out that the wizard to be able to do that, conjured a spell with the help of a giant gramophone, built by Bob, and a voice of a mermaid, the fisherman's lover. The evil wizard offers an exchange and a sacrifice. The faith of Fricarft is in the players hand, whether he chooses to sacrifice himself, his party or finds other ways to trick the wizard.

In the end, a ballad is composed in honor of this adventure, called "The Ballad Of The Wizard and Sacrifice".

3.1.2   Generation of Feedback Through Regret

In order to compare how effective my hypothesis is, it was developed two variants of the same narrative. One with no attention given to the inactions of the players (e.g., a character gets robbed, but the player does not know), and a second variant where feedback of those inactions was added to appeal towards
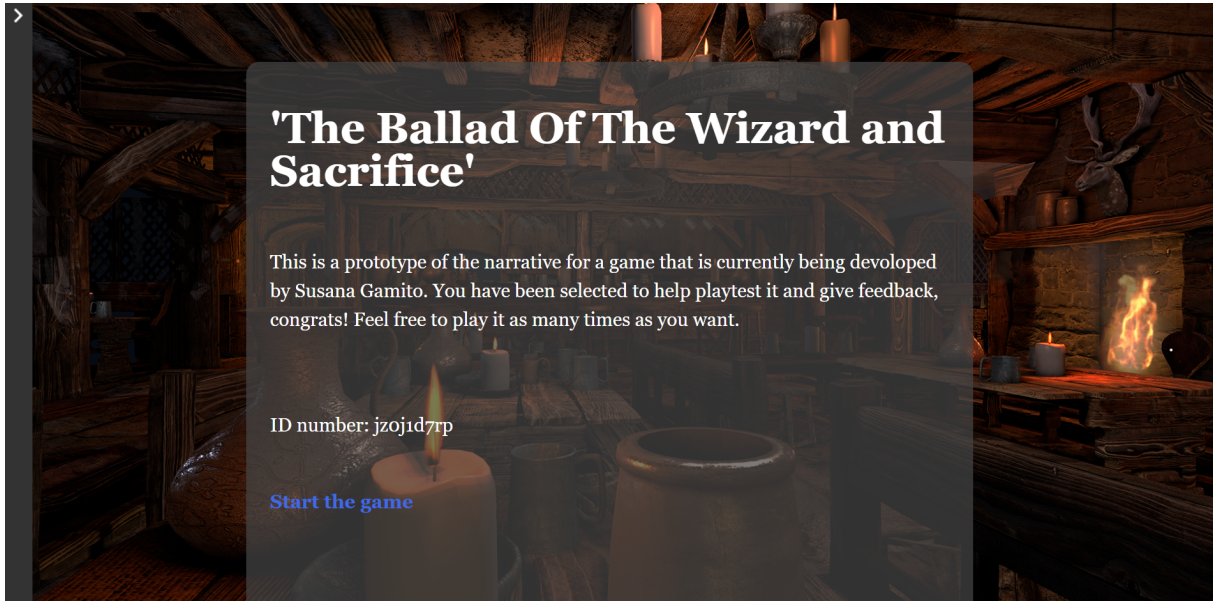
Figure 3.1: "The Ballad Of The Wizard and Sacrifice" home page.

the emotion of regret of the players (e.g., a character gets robbed and gets gets very upset towards the player). At its core, the narrative was the exact same in both versions, the only variant that changed between them was the notion of inaction by bringing feedback to the players about the consequences of the decision they did not take during the playthrough.

For that, it was necessary to build a system that produces feedback towards both actions and inactions of the players. This system need to be applicable to every moment of decision that changes the direction the narrative is taking, this is, the important decisions that block a branch of the narrative (e.g., choosing one door over the other). This is achieved by manipulating the storytelling of the event and making the player realize that something did not happen. By bringing the regret feeling to the storytelling, players might get the sensation that something changed and they did not do anything about it. Consideration also needed to be taken regarding the experience players got, because although regret is used to make players wonder about their decisions, it can not make them feel bad about the game experience in general, in a manner that they might feel annoyed or frustrated.

3.2 Implementation Tools

In this section I will be presenting some implementation tools that helped me develop my project. There were a total of three implementation tools and a description of each of them is featured in the following subsections.
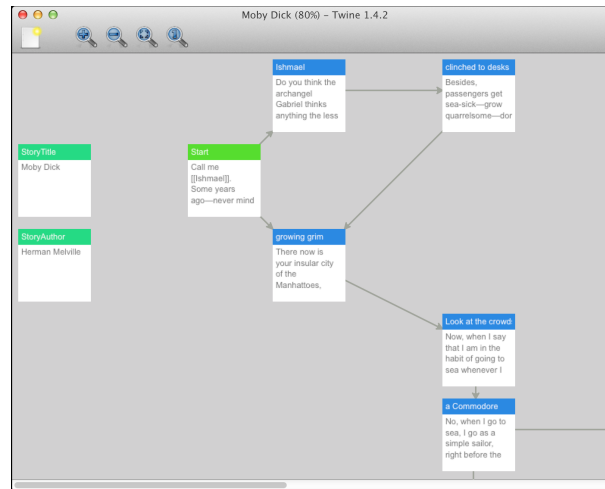
Figure 3.2: Editing a story with Twine.

3.2.1 Twine

A storytelling implementation tool was picked in order to help explore my problem through telling a narrative to the players where they get to be the protagonist and make decisions that influences the world and those around them. This features tools that are most used on Interactive Storytelling research, such as in International Conference on Interactive Digital Storytelling (ICIDS)[1] and Artificial Intelligence and Interactive Digital Entertainment (AIIDE)[2] conferences, and game engines that also provide great support to create story-oriented 3D video games.

Modern IF creation tools invented tend to explore players interactions outside of the traditional parser, generating hypertext-driven work that any modern web browser can load. Chief among these is Twine[3], originally created by Chris Klimas in 2009 and is now maintained by numerous people at several different repositories. Twine publishes directly to HTML, so it possible to post finished work nearly anywhere. Anything created with it is completely free to use any way desired, including for commercial purposes. It is not necessary to write any code to create a simple story with Twine, but it is possible to extend the created IF stories with variables, conditional logic, images, CSS, and JavaScript. As a creative tool, Twine can match its own exposed complexity to the creator's skill level. Users with little or no programming knowledge can create simple but playable IF work, while those with more coding and design skill, including those developing these skills by making Twine games, can develop more sophisticated projects. Little wonder that Twine's visibility and popularity in educational contexts has grown quite a bit in recent years [30]. In Figure 3.2 we can see an example of an IF (Moby Dick) with a graph like structure using Twine.

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[1] International Conference on Interactive Digital Storytelling, https://icids.eae.utah.edu/
[2] Artificial Inteligence and Interactive Digital Entertainment, https://aaai.org/Conferences/AIIDE/aiide.php
[3] Twine Homepage, https://twinery.org/

For the creation of the narrative my system worked with, the storytelling implementation tool I choose was Twine due to the reasons explained above, and, above all, it also has easy access for all platforms, including mobile, since is executed on the browser, for easy access to my focus group.

3.2.2 Server: Instituto Superior Técnico (IST) Sigma

In order to make the game public and available to my focus group, it was needed to send the Hypertext Markup Language (HTML) file provided by Twine to a server. IST makes available for the students a Unix shell service. This shell runs on what is called the Sigma server, at sigma.tecnico.ulisboa.pt, accessible through applications with Secure Shell (SSH) protocol. As an user and student at IST, I authenticated to Sigma with my the Técnico ID and then could run on it my project, the two versions of the game, together with the logging information extracted from the users as explained later in Subsection 4.2.2. Other students can do the same and run on it other types applications such as scientific calculation work, programs of research, experimentation and/or simulation and native Unix applications. Sigma bases its storage on the Andrew File System (AFS) service.

3.3 Architecture

In this section I will be explaining the practical steps done for the implementation of my project, namely the architecture of the narrative, the architecture of the feedback through regret system and the architecture of the storytelling system.

3.3.1 Narrative Architecture

In a branching narrative, the protagonist is given a choice of paths, but they are not usually brought back to the main linear path of the story. In doing so the story will end up with a series of alternative endings. My storytelling narrative architecture was composed by multiple branches where the players could explore. The system followed a graph architecture where each node represented a decision moment in the story line that led to new decisions and nodes in the graph, so on. Each circle represents a branch of the narrative containing a passage of it. In every branch, the player is given options to choose from. One option of a branch can lead to anywhere in the narrative structure, not necessarily to the next level. In a branching narrative, there are more than one endings written in the game script, and the players' choices decide which ending they will reach.

That is somewhat what a normal branching narrative system follows. The difference in my approach was that for every action not taken there was also a consequence. The branching tree for each decision node taken, new ones are generated, possibly taking huge propositions. For this reason, my narrative
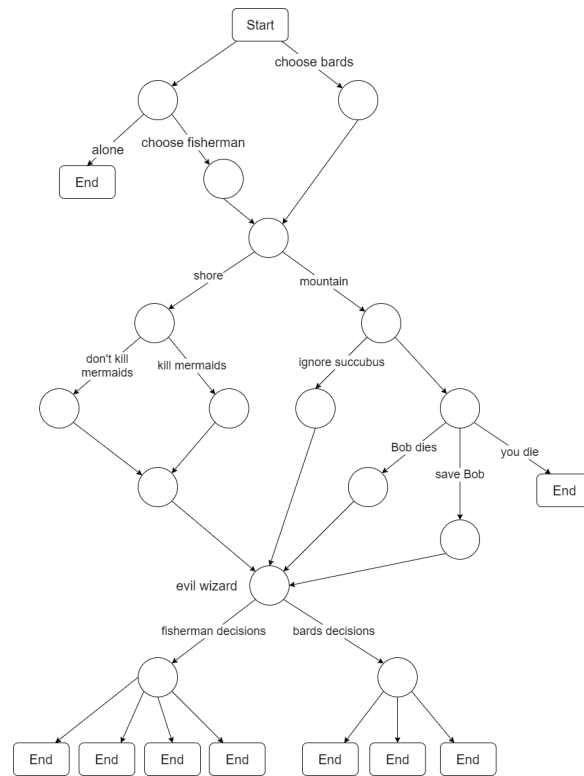
Figure 3.3: Narrative branch node diagram.

was short in length but wide with multiple decision moments. To help combat this complexity, I used what is called a world state method. It allowed me to create more advanced branching narratives, without writing thousands of nodes. By setting a variable to a choice (such as true/false, or increase by a factor of 1, etc.) (Figure 3.4). Then, later on, when text is being printed by the computer, it can check that variable and print different text based on the value of that variable. This can limit the choices available to the players, or simply change whether the players characters are described as a "he" or "she." For example, if the story has where a certain character that can either die or be rescued in one scene near the beginning. This can be set as a variable: Bob_Dead = true. Later on, this can be referenced like, if Bob_Dead is true, then one character might say, "I really miss Bob" or it might have some feedback when Bob dies, such as hearing him scream in pain. If Bob_Dead is false, then Bob might say something instead because will not be dead.

The world state method was used in form of chapters. These act as main divisions in the narrative and clearly outline where the branches start and when they join together. They also serve the purpose of being start points for the players replay the game from, since there is also an replay system incorporated in the project to evaluate the replay value of the game. Meaning, once the players finish their first playthrough of the game and if they choose to play the game again, they can do so by selecting from what chapter of the narrative they wish to do so. There are a total of three chapters on the narrative,
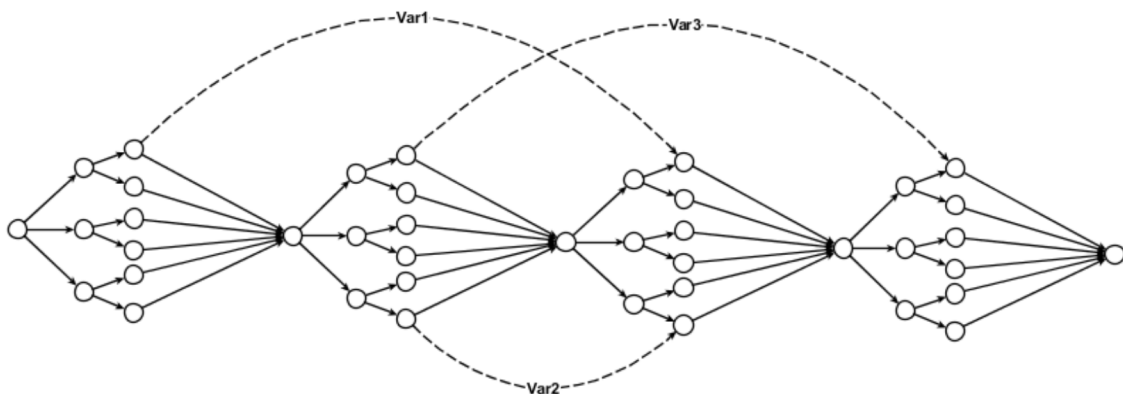
Figure 3.4: Branching narrative diagram.

each one serves a purpose and the following list describes that:

- **Chapter 1 (Tavern):** This is the introductory chapter of the game, where it is presented to the player his/her character, their motivations and the main plot. It is when the bard is at the local tavern and the first issue with sound happens. It is also when the players gets to meet some characters and gets to choose who their party is going to be.

- **Chapter 2:** This chapter follows the adventure of understanding the problem and the players journey to fight the evil wizard. How and which path they choose depends with whom they align in Chapter 1, and so the Chapter 2 can be one of the two following paths:

  - **Chapter 2a (Mermaids):** The player joins the fisherman to find his lover on the shore of Fricarft, where there an encounter with mermaids.

  - **Chapter 2b (Succubus):** The player joins the group of bards towards the mountains, where there is an encounter with succubus creature.

  Depending on how the players handles these encounters, they might get rewarded with a magical item that later might help them fight the wizard, or the players might find themselves in difficult situations.

- **Chapter 3 (Wizard):** This it last the chapter where the players have reached their destination and have the final encounter with the evil wizard. This is the junction of the last chapter meaning that, independently of whom the players decided to join with in the beginning of the narrative, at Chapter 1, they will reach this Chapter. The difference will be in the decisions they need to take. This is the chapter that the players need to figure out to defeat the villain and change the end of the story and the outcome of all Fricarft.

Considering that, and by observing Figure 3.3, the final narrative has two main branches, which are evident in Chapter 2. More branches happen during Chapter 2 by the encounters that happen there. In the final Chapter 3, multiple branches happen with the decisions made that directly influences the ending of the story. Leading to that, there is a total of nine endings endings, where seven happen in the last chapter, and the other two can happen during the playthrough.

3.3.2 Feedback System Architecture

Having the narrative set and the node architecture done, the next step was to implement the feedback system for the inactions of the players. Still having the notion of a node graph, and considering one node as being a moment of an important decision where the players needs to make, that node (C) is going to link to other two nodes. Which node is going to show depends on the choice of the player. One of those nodes (A) is going to be choice of the player to take action, to say yes, to do something regarding the important decision presented to him/her. That node (A) shows the direct result of the consequence of the action taken and the story moves forward. The other node (I), is the opposite of the node (A), is to say no, to ignore the quest, the action to take no action. Normally, for that, in a traditional approach, the story would also continue it's course and little to no attention is paid to that, and so, the node (I) merges into the next (C) node for the next decision.

The architecture of my feedback system offers to change that. Now, instead of the node (C) go straight to node (I), there is going to be an extra node in between, the node (F1). This node (F1) introduces some kind of feedback to show to the player that something important was missed, the the node (A) is now off limits. This is the consequence of going to node (I), it is shown right after the path is blocked, but, also when the player tries to interact with it. So, beyond having an extra node (F1) when going from (C) to (I), the is also other node (F2) for when the players tries to go to (C) node again and see if (A) is still available. Both nodes (F1) and (F2) are feedback of the consequence of (I), the difference between them is that (F1) is the inaction happening, and (F2) is showing that (C) is no longer available, is occupied.

The Figure 3.5 shows this interaction, where the dashed line demonstrates the traditional approach and the solid line demonstrated the feedback system approach. A good example of this in the narrative is the following passage in Figure 3.6. In this passage, the player encounters an evil creature inside of a dungeon in which the player's companions begin to flee. This is considered a moment of decision (C), where the player has two options, flee with them, an inaction (I), or confront the creature, the action (A). If the players decide to not confront the creature (I), in the traditional approach the story would go on normally to the next passage, exploring the dungeon (Figure 3.7). For the feedback system version, the feedback (F1) would be shown before the narrative continues. In this case, in Figure 3.8, the players can hear the creature screaming in the distance, implying that it has a hostage and it could kill him. Then,

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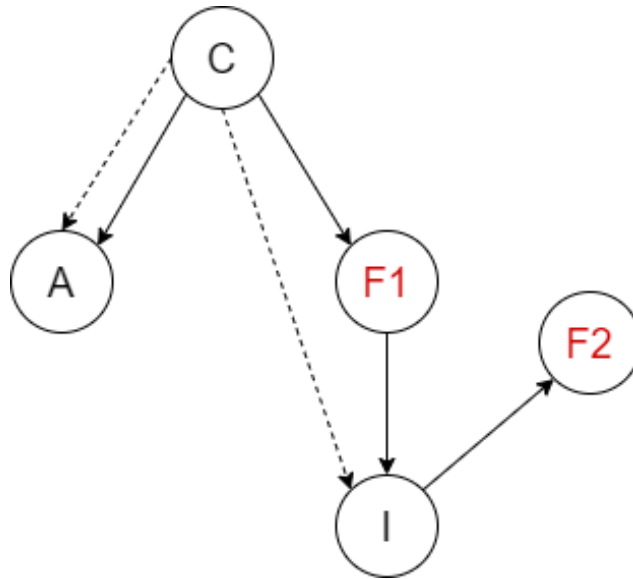
Figure 3.5: Feedback system diagram.

the narrative continues in Figure 3.9, but now with the feedback there is a new option there weren't in Figure 3.7, without the system. The option for the players to try and explore the lost action (A). If the players felt any regret and wanted to go back the action not taken, it would be shown the second feedback (F2). In this case, it says it is not possible to go back and the player is forced to carry on (Figure 3.10).

To generate this feedback, there needs to be in consideration the storytelling aspect of the decision. There must be a reason why the player cannot return for that decision, there needs to be closure. To convey that, it needs to appeal to the senses of the players, such as visual cues, sounds, smells and vibrations. Other the senses, the feelings and emotions of the players were taken in consideration as it is a big part of the experience of the game. Players need to connect with the narrative and characters and feel that something happened. So, in order to do that, the feedback was generated with the intention of making players feel some kind of regret. In the example shown before, the screaming of the Bob in despair, not only indicated that he was trapped in there, but also hinted of what would happened in that branch.

3.3.3 Storytelling System Architecture

The narrative and feedback system was implemented in the chosen storytelling system tool, Twine. Twine, like most text-based tools, already support this node approach to narrative systems, so it was be fairly simple to use. What was needed to be done was translate the node diagram of the narrative already made to the node system in Twine. For each node there is a description of that passage of the narrative for the player to read and choices the player can take take by clicking on it, theses choices is

Figure 3.6: Making an inaction in a decision moment.

Figure 3.7: Inaction without feedback.

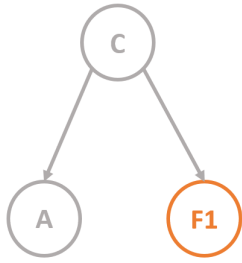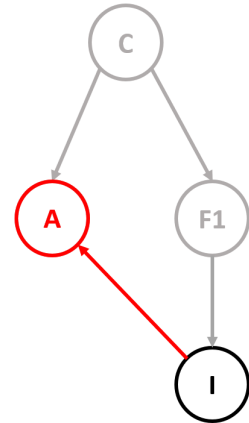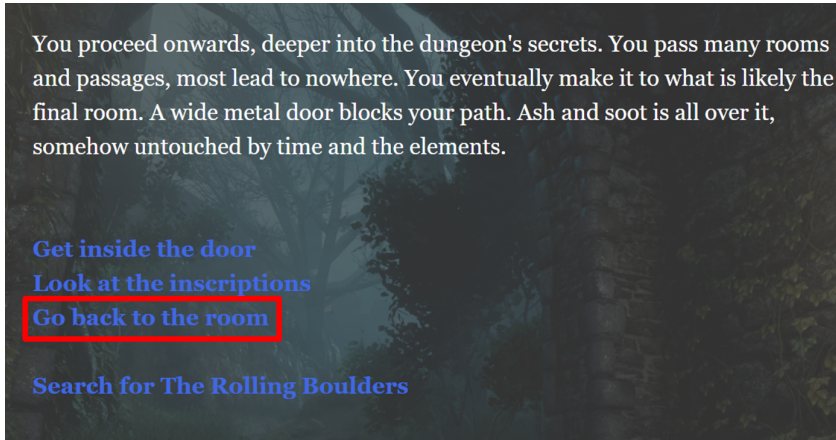**Figure 3.8:** Inaction with first feedback.

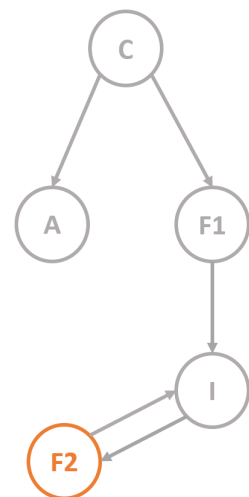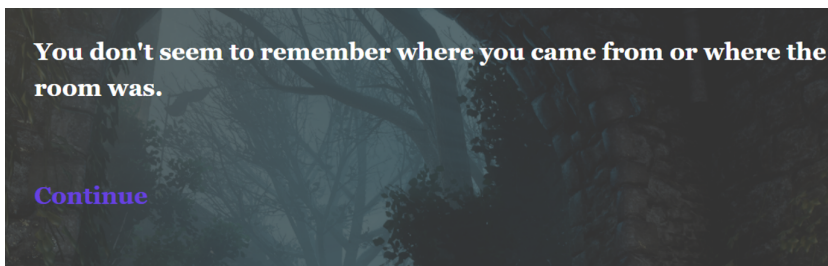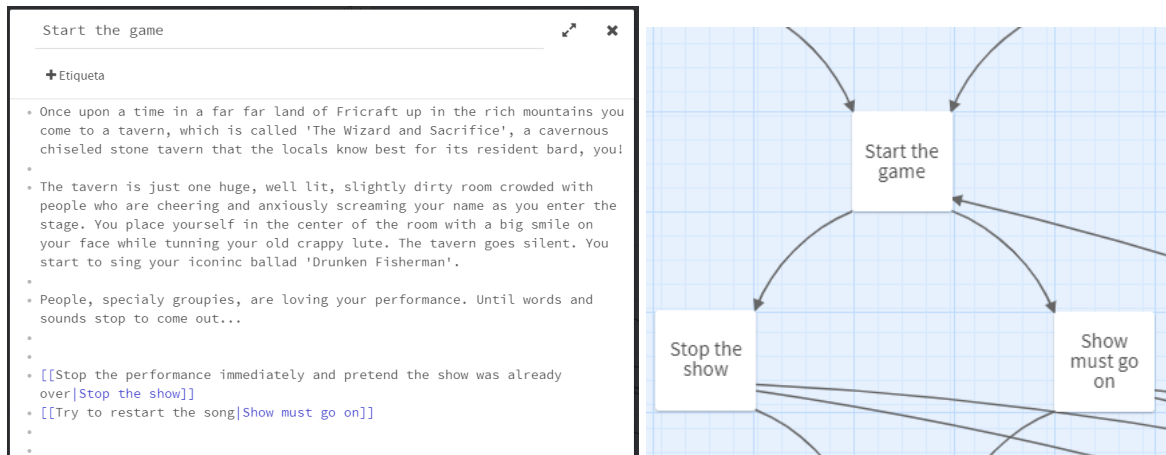**Figure 3.9:** Wanting to back to the action after the feedback.

Figure 3.10: Second feedback after attempting to go back to the action.

**Figure 3.11:** A passage from the narrative and its node structure.

what links one node to the other. Figure 3.11 shows and example of a node of the narrative in Twine. A node can link to multiple nodes, be linked by multiple nodes, and can link to itself.

Variables were used throughout the project in order to keep track of the important decisions that affected the course of the players story. It was used whether to check with whom the players joined in a party, if they have gained any magic item, and specially for the differentiation between versions of the narrative. Meaning that the different versions of the game were made in the same Twine project, since the narrative is all the same and the only thing that changes between them are new extra nodes. So, at the beginning of the narrative, at the root of the graph, it was set a variable to distinguish between them. Then, whenever an inaction happens the next link is decided based on that variable, the feedback nodes only happen if the variable says to use them.

Another important step towards creating the storytelling system was to make a replay system, so players could play the narrative as many times as they wanted. There were two ways the player could replay the game. They could either restart the game from the beginning at any given moment by stopping their current playthrough, as there was always the option/link to restart the game in every single node. The other way to replay the game was to do it when finished one playthrough, as it was only possible at the end of the story. Then the players could choose from where they would like to do so (Chapter 1, Chapter 2 or Chapter 3), considering their last decisions made in that playthrough are kept in the world state if they choose not to start from the beginning (Chapter 1). Meaning if players joined with the group of bards in their game and want to replay it from Chapter 2, it will be Chapter 2b. This is set up, again, by using variables and links which lead them straight to the beginning of the desired chapter. The final narrative graph implemented in Twine is the one shown in Figure 3.12.

To conclude the game, Cascading Style Sheets (CSS), music and JavaScript were added to improve the experience. Since it was a text-based game, in order to make the players feel more immersed in the game's narrative, I added some background images to the HTML file, which changed between chapters

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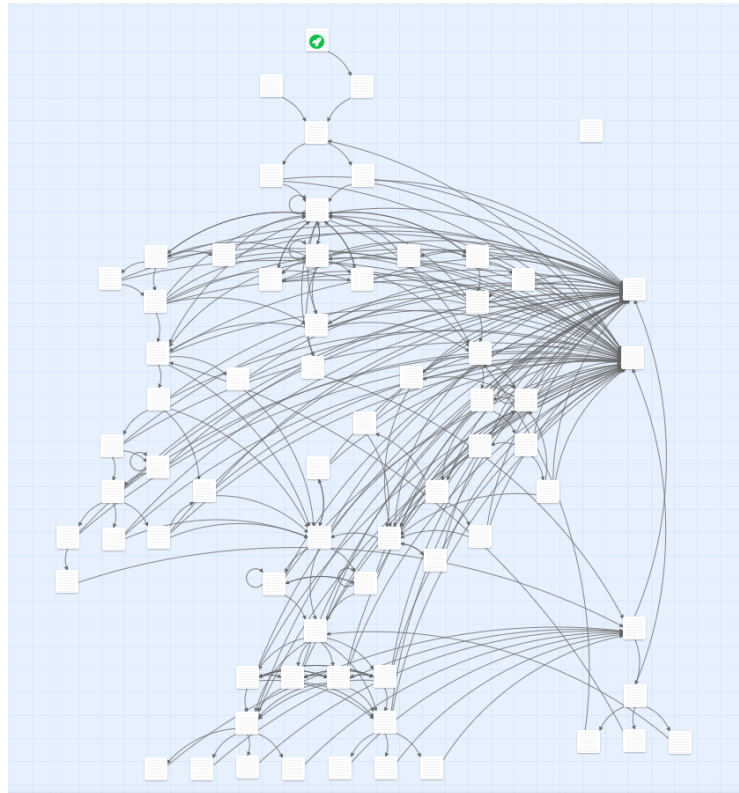
Figure 3.12: Final Twine story graph.

to adapted to its setting and help the player localize himself within the narrative. The appearance and behaviour of the story during a playthrough is controlled by twine story format. Each format has a different look and feel out-of-the-box, but all of them allow to customize their appearance and are designed to work reasonably well on a mobile browser, too. The story format I used was Harlowe 3.1.0 which is the default format for Twine and is focused on making it easy to add basic interaction to the stories in a readable, concise way. Adding music was also an important set to teleport the player inside the narratives world. I used a plugin for Twine Harlowe called HAL[4] which is a audio library designed with SugarCube's[5] audio subsystem and was added to my Twine narrative through JavaScript. It supports all the core features expected from an audio library (playing across passages, fading, looping, individual track volume levels, etc) and audio playlists. I used the following royalty free medieval music playlist: https://youtu.be/K2maH-XVEGQ.

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[4]HAL GitHug page, https://github.com/ChapelR/harlowe-audio
[5]SugarCube v2 Documentation, http://www.motoslave.net/sugarcube/2/docs/simpleaudio-api

4

Evaluation

Contents

In this Section, I will be discussing how I how evaluated the developed architectures that served to test my initial hypotheses for the project and their results.

4.1 Evaluation Procedure

In order to evaluate my model and its architecture, I brought a group of people to play the experience and answer a few questions regarding their need to replay the game and their perception of its narrative scope. This group of people needed to be separated in half and given different versions of the game. One version where I would test my hypothesis with the generation of feedback for the inactions of the players when playing the narrative, and the other version with a more traditional approach where there is no notion of inaction of the players, has explained in Subsection **??**. This way I could compare both results to check whether my model had any impact on the players. Although, the overall experience was identical in both versions as well as the evaluation procedure, which followed the same guidelines.

The evaluation is composed basically of three components, the questionnaire, which will be explained in more detail in Subsection 4.2.1, the experience/game which I covered in Subsection 3.1.1.A, and the logging information I retrieved from the players' playthroughs of the game, which is explained in Subsection 4.2.2. The procedure has the following structure: the first part where I obtain some information about the players profile and their perspective on games via questionnaire; The second part where the players get to play the game with the version assigned to them, as many playthroughs of the story has they wish to, which is logged in a file; Then, once they have finished the experience, the players' resume the questionnaire to answer questions in order to evaluate both the experience and the hypothesis.

This process was conducted remotely, where I would reach out directly to people willingly to participate or through online communities related to the subjects of video games and storytelling, such as *GAIPS*[1], *Laboratório de Jogos do IST*[2], *Grupo de Roleplayers de Lisboa*[3] and *Interactive Fiction*[4]. To each person it was given an link that would redirect them to the given questionnaire. To make sure the population would be evenly distributed, this link is a PHP file that randomly assigned players' to one of the two possible versions of the game. Alongside with the link, some introductions and instructions were given about the experience, including the time it would take to finish, which would take anywhere between 10 to 20 minutes, depending on how many times each person wanted to replay the game. To avoid biased opinions and results from the users while completing the questionnaire, it was not revealed the true intentions of this experiment until the very end. To be more precise, the experiment was presented as a game experience study opposed to an evaluation on weather highlighting the inactions of the players could increase the game's replay value. This way, the players would not be hyper vigilante

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[1]GAIPS, Facebook group homepage https://www.facebook.com/GAIPS-Lab-241502272551841/
[2]Laboratório de Jogos do IST, Facebook group homepage https://www.facebook.com/LabJogosIST
[3]Grupo de Roleplayers de Lisboa, Facebook group homepage https://www.facebook.com/groups/gruporoleplayerslx
[4]Interactive Fiction, Facebook group homepage https://www.facebook.com/groups/int.fiction

towards their inactions and the amount of playthroughs they would have completed, delivering more realistic results.

There were two stages for the evaluation procedure: the preliminary evaluation discussed in Subsection 4.3; and the final evaluation mentioned in Subsection 4.4.

4.2 Evaluation Materials

4.2.1 The Questionnaire

The main component of this evaluation was the questionnaire, which is a good instrument to convey and collect information from respondents. Mainly giving the link to the game so the players can experience it and answer some questions regarding it. Since there is two versions of the narrative, as mentioned in Subsection 3.3.2, I opted to create two questionnaires. These questionnaires have the same structure and questions, the only thing that differs between them is the narrative associated. In this case, one questionnaire with the traditionally approach narrative, and another questionnaire with the narrative I test my hypothesis with. This way, its much easier to compare, separate and select data.

The questionnaire is structured in 5 different sections that are listed below, but I will get into more details in the next subsections:

1. An introductory section giving a brief overview over the premise of the study and some instructions for the users to follow. There is also a disclaimer regarding the data stored which only served for the purpose of this project and would not be shared;

2. A section for gathering some basic information regarding the players profile like age and gender, and 6 more questions, 3 of them about the players' opinion on story in games and the importance of it. Such as IF and video games with branching narratives, whether they are familiar with those types of games and if they enjoy them. The other 3 questions were related to the habits the players have when replaying a game. To be more precise, the frequency they replay a video game or an IF, why they do it and which techniques they use when doing it. These questions where all multiple choice questions with only one possible answer in order for the players to pick the one that they better identify with, and in consequence made evaluating the results more efficient;

3. The section to play the experience, which redirected the players to a link where my experience was published, which is attached in Appendix A. Depending on the version of the questionnaire, the link would redirect to the associated narrative. There is also some instructions on how the game and IF works for those who were not familiar with it. Since the questionnaire was answered in a different platform the narrative was played, I created an ID system for each player to be able to join both

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data gathered from the questionnaire and the narrative from that specific person, as explained in Subsection 3.1. So each player upon entering the narrative would be given an ID number that they would need to enter in the questionnaire. In this section the players were encouraged to play the narrative as many times as they desired and from where they wanted, but never to reload the page so as to not reset the ID number;

4. This section comes after the players have played the experience the number of times they felt compelled to. It is composed of various groups of questions. The first is a set of 14 questions taken from the In-game section of the GEQ to assess how the players felt about the game while playing it. Using a Likert scale of 0 to 4 where users would rate how much they would agree with the sentence with: 0 being "not at all", 1 being "slightly", 2 being "moderately", 3 being "fairly" and 4 being "extremely". This questions score the game experience on seven different components: Immersion, Flow, Competence, Positive and Negative Affect, Tension, and Challenge. After that there is a section of multiple choice questions similar to second section of this questionnaire, to check if their behaviour changed after playing the experience. Last but now least, I added 8 more items I created myself that relates to the actions and inactions of the players. I named this score components the following: Agency, Choice Perception and Narrative Perception. The final Likert questions were related to the emotion the players felt after they have made a decision, namely the regret and disappointment they felt towards them. It has a total of 7 items based on the RDS, the last item being a multiple choice item rather than a Likert scale like the remaining items. It evaluates the experience in the following components: Affective Reaction, Regret and Disappointment Index;

5. The final section to thank the players for their participation in the study and give further explanations regarding the study topic.

Both questionnaires were made using Google Forms, which are annexed at the end of this document at Appendix B.

4.2.2 Logging Information

An effective way to gather information directly from the experience is through logs. While the user is playing the game, some useful information regarding the players choices throughout their playthroughs were stored in a separate file. This file has the following structure:

1. The players' ID number;

2. The number of the version they are playing (1 for the Traditional Approach, 2 for the Testing Hypothesis);
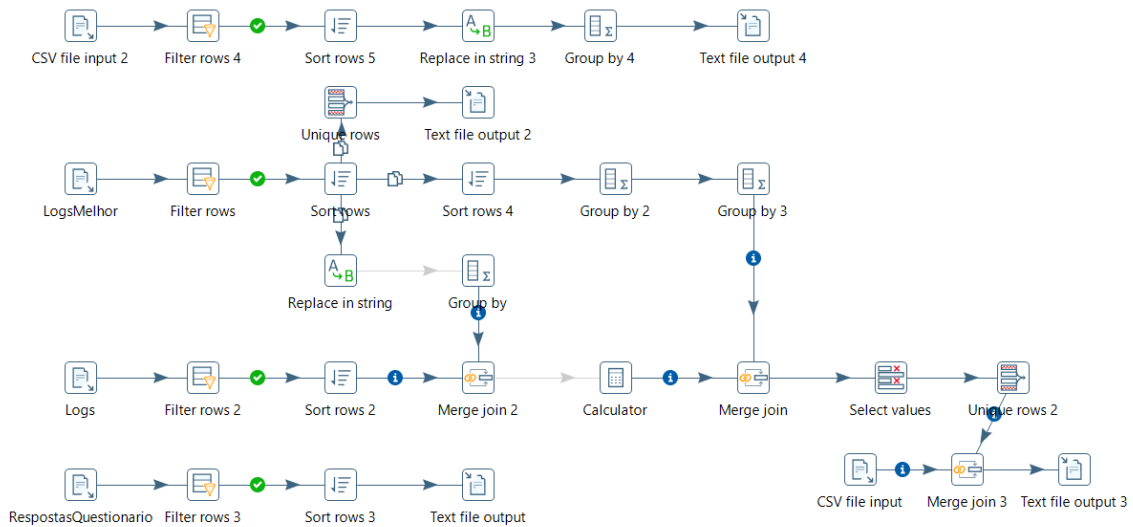
Figure 4.1: Processing of the logging information.

3. A list of nodes in the narrative the players traversed through, which represents the choices they have made. To each node there is a name associated referring to the passage in the narrative, as explained in Subsection 3.3.3.

With each log I was able to collect data which led me to understand the following:

- The real number of times the players played the experience: `num_playthroughs_logs`;

- From where did they stopped the game: `num_stop_middle` (in the middle of the narrative) and `is_finals` (once they end a playthrough);

- If they experienced different scopes of the narrative: `num_total_finals` (number of different endings they got);

- The most visited nodes: `<node_name>` (for number of times that node was visited);

To clear and group the raw log information I used Regular Expression (RegEx) and the data integration tool Pentaho[5]. Using Pentaho, I could transform complex data into meaningful reports and draw information using transformations like sort rows, merge joins, group by, etc. Figure 4.1 shows the processing of the logging information. Then, this information could later be joined with the data gathered from the questionnaires so it could be analysed and processed through SPSS Statistics (Version 26)[6], a software for statistical data analysis developed by IBM.

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[5]Pentaho Homepage, https://www.hitachivantara.com/en-us/products/data-management-analytics/pentaho-platform.html
[6]SPSS Statistics Homepage, https://www.ibm.com/products/spss-statistics

4.3 Preliminary Evaluation

After concluding all the materials needed for the case study, it was conducted a pilot experience with 4 participants, all playing the version of the experience where I test my hypothesis. This preliminary evaluation was a quick way to check whether it created the desired impact in the players perception of the narrative and if the experience was good enough, as so not to interfere with the study at hand. With this, it was also possible to gather useful feedback and possible improvements for the final evaluation. The sample was very small but allowed for and in depth discussion with the participants regarding various aspects of the experience.

The evaluation followed the same procedure explained before.

4.3.1 Results

The Google Forms besides being a good tool to create surveys, it also has a feature to quickly visualize the data gathered from the answers participants gave. Through these graphs I could briefly assess how the preliminary evaluation performed, which seemed to have had an overall positive result. I did not use more sophisticated ways to analyze the data because the number of subjects were not enough to be able to do so.

This small group of 4 participants were mostly males, apart from one female, all between the ages of 20 and 30, and had a very similar player profile. All played video games for the story and gameplay, including IF (apart from one person) and video games with branching narratives multiple times. What most differs between these participants is the reason why they replay the video game and what techniques they prefer to use when doing it. But the majority tend to replay the game by choosing different options in order to experience different stories. Having said that, I concluded that these are the type of players that I categorize has being my target audience. People who are highly interested in the problem I'm approaching. Although I want to reach a much broader audience, this was good kick start to see if I could first reach to these people.

Table 4.1 shows the scoring for each of the seven components of the In-Game section of the GEQ, with their correspondent median $\widetilde{x}$, minimum value min and maximum value max:

As we can see it had very positive result. Because of the high scoring in the positive components, such as the flow component, the competence, the sensory and imagination immersion component and mainly the positive affect components which almost reached the top score of 5, and the low scoring on the negative components, such as the tension component and the negative affect component which both had the scoring of approximately 0. This means that the experience was overall enjoyable and good enough as so not to disturb with the study at hand, creating the possibility of players wanting to experience the game again. About the scoring of the challenge component, which was slightly high

	$\widetilde{x}$	min	max
Competence	3.0	2.0	3.5
Sensory and Imagination Immersion	3.3	2.5	4.0
Flow	3.3	3.0	3.5
Tension	0.0	0.0	2.5
Challenge	2.5	2.5	3.0
Negative Effect	0.0	0.0	1.0
Positive Effect	3.6	2.5	4.0

Table 4.1: Results of the GEQ items in the Preliminary Evaluation.

	$\widetilde{x}$	min	max
Affective Reaction	2.3	1.5	2.5
Disappointment Index	1.3	0.5	3.0
Regret Index	2.5	1.0	3.5
Choice Perception	3.5	1.5	4.0
Narrative Perception	3.5	1.0	4.0
Agency	3.8	3.0	4.0
Actions	4.0	2.0	4.0
Inactions	3.5	0.0	4.0

Table 4.2: Results of the RDS and choice items in the Preliminary Evaluation.

scoring, may represent some difficulty when reading through the interactive fiction.

All player subjects played the game multiple times and passed through different narrative ramifications by making different decisions each time, as their profile indicated. All of them did it to find different possible endings, except for one player who played multiple playthroughs of the game due to the fact he/she did not like the choices made.

Last but not least, the following results are from the Likert scale questions taken out to the RDS and the last five items I created to evaluate the actions and inactions of the players. Each of those items were composed by two questions that later were checked whether they reported in a similar manner the self-assessed arousal of each user, a Chronbach's Alpha test was run in SPSS between them. The result was higher than 0.7, which means that the variables being compared have a strong correlation in values, as mentioned by Taber [31], for example. This means that there is a strong correlation between the two existing arousal tests I used for my work. Table 4.2 shows the results, with their correspondent median $\widetilde{x}$, minimum value min and maximum value max:

Upon analysing this results we can reach a few conclusions. The participants in general had a high intensity of affective reaction, which is defined by the physical and emotional reaction that a person has to a situation, such as happiness of winning a competition or sorrow of receiving bad news [32]. Mean-

ing participants felt a positive feeling towards the narrative/experience. The regret and disappointment indexes indicate whether the participants would blame themselves for a bad outcome or would attribute a given outcome to circumstances and misfortune. In this case, the regret index had a much higher score than the disappointment index, which means they attributed the consequences of bad outcome to their own actions. From the feedback gathered after the participants finished their evaluation, I was able to conclude the game had been a success as they seemed very enthusiastic and hopeful for future versions of the game. One participants in particular made sure to pass through every branch in the narrative while sending some print-screens of it, laughing their way through it. Another participant actually expressed their regret towards their decisions of not joining the bards.

4.3.2 Problems Approached and Fixes

Although the results of the preliminary evaluation were quite satisfactory there were a few issues that required some resolution.

The main problem that need to be attended was regarding the questions of the RDS, which involves the affective reaction and the regret and disappointment indexes. To verify whether and to what extent participants actually feel regret or disappointment, the emotion produced by outcome of an event needs to be perceived as a negative one, since regret and disappointment are categorized as such. In this case, the item *"I am sorry about what happened to me"* had a much lower scoring then the item *"I am satisfied about what happened to me"*, which produced the high value in the affective reaction as discussed before. Concluding that the participants had a positive emotion after playing all the playthroughs, resulting in discarding the results of the regret and disappointment indexes, although they showed the players attributed the outcome internally. One reason for this to happen might have been by the fact that theses questions were answer later after concluding all the experience and possible playthroughs of the game, meaning that the participants might not feel any regret, disappointment or any bad emotion because they were able to find out all possible endings and missing pieces from the narrative, considering the players had played multiple times, which were the case has explained before.

To correct this I changed the order of the questions and the structure of the questionnaire. The Likert scale questions of the RDS were moved to after the first playthrough of each player of the narrative, to the section to play the game in the questionnaire. It is when the player has a motive to feel some kind of regret regarding their initial choices and producing some stimuli for them to go back and change those choices, resulting in another possible ending and more exploration of the narrative. Therefore, was asked for the player to play the game once, go back to the questionnaire to answer these questions, encourage them to play the game again and only after they are finished with their playthroughs they can go back and finish the questionnaire. Another item that was added to this section was an open ended question asking the player which decision of their playthrough they would change next and why. This

would allow me to understand where in the narrative participants were more incline to change and feel regret in their choices, and whether there would be any difference between versions. A final change to the questionnaire was to collect the email in the final section at the participants who would want to be notified for possible future versions of the game. Producing the final questionnaire which can be seen in the end of the document at Appendix B

The high scoring in choice perception indicates the players have high notion of the narrative scope, having a higher score in the ”I covered all the possible decisions” item than the ”I did not explore all possible decisions” item, which is confirmed by the logging information. But this occurrence can be explained by the fact that all participants replayed the game multiple times and fitted into my target audience. Having said that, it encouraged a deeper evaluation with a more participants, which lead to the final evaluation.

4.4   Final Evaluation

The Final Evaluation proceeded as explained before in Subsection 4.1, just like the Preliminary Evaluation, except this time the questionnaire changed and the amount of participants needed was higher. The versions of the questionnaire are classified in the following way:

- **Version 1 (V1)**: The version where the classical approach to the narrative is taken, giving attention only to the actions of the player;

- **Version 2 (V2)**: The version where I test my hypothesis in the narrative, giving attention to the actions as well as the inactions of the player;

Divulgation through groups in and out of social media was an important step towards gathering as many participants as possible. In the end, the Final Evaluation was composed by a total amount of 64 participants, 32 participants for each version of the narrative. People overall seem to be eager to try the narrative and very participative, some even helped by bringing more participants to the evaluation.

4.4.1   Final Evaluation: Results

For the Final Evaluation the results from both versions of the questionnaire where analyzed using the SPSS Statistics (version 26) software tool from IBM. The variables were the same as explained in Subsection 4.2.1. The logging information retrieved from the players experience was cleaned by using RegEx the data and later imported to Pentaho, also explained in Subsection 4.2.2.

The following subsections addresses the analysis of each section of the questionnaire comparing between versions: the first one describes the demographic data of the participants, then a section
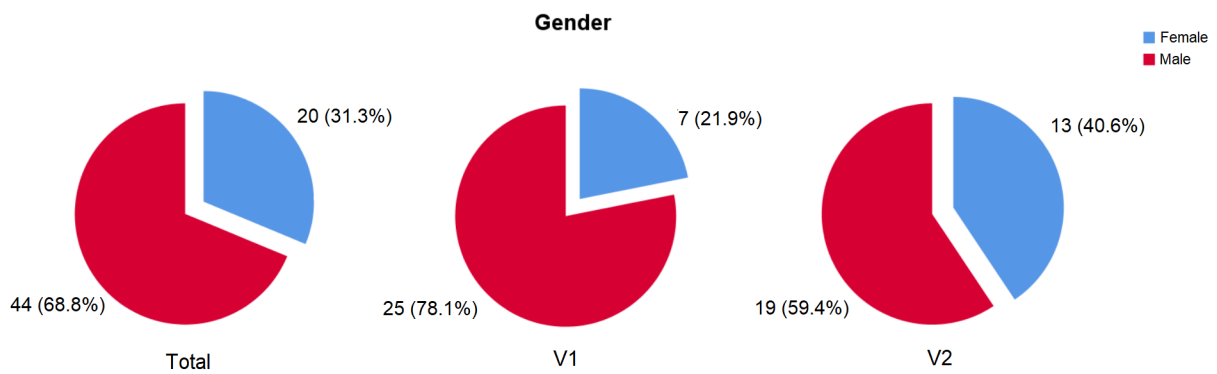
**Figure 4.2:** Pie charts of the gender distribution.
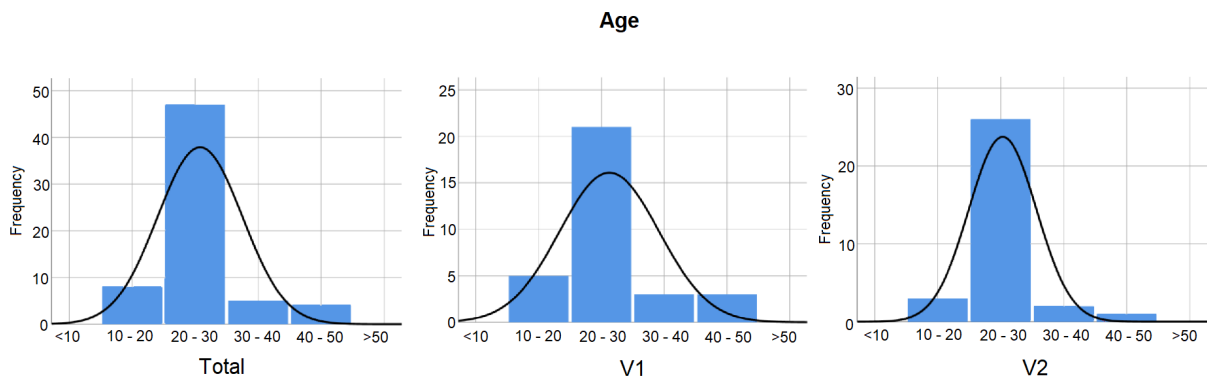
Figure 4.3: Histograms of the age distribution.

addressing the regret analysis of the questionnaire, a section for the analysis of the logging information of the game, and a final section describing the game experience analysis.

4.4.1.A Demographic Analysis

For each version of the questionnaire there were an equal amount of 32 entries, making up to a total amount of 64 participants. In total, from these 64 participants, 44 classified themselves as Male (68.8%) while 20 classified themselves as Female (31.3%). The male gender was the majority amongst the participants, although in the version 2 (V2) the genders are more balanced, with 19 male participants (59.4%) and 13 female participants (40.6%), when compared with version 1 (V1) of the experience, with 25 male participants (78.1%) and only 7 female participants (21.9%). There is a visual representation of the gender distribution in Figure 4.2.

The ages of all 64 participants ranged from 10 to 50 years old, with a mean value being between the age of 20 and 30 in both versions of the experience, with a total 47 participants (73.4%) in that age range. Figure 4.3 shows the age distribution in Version 1 (V1), Version 2 (V2) of them combined.

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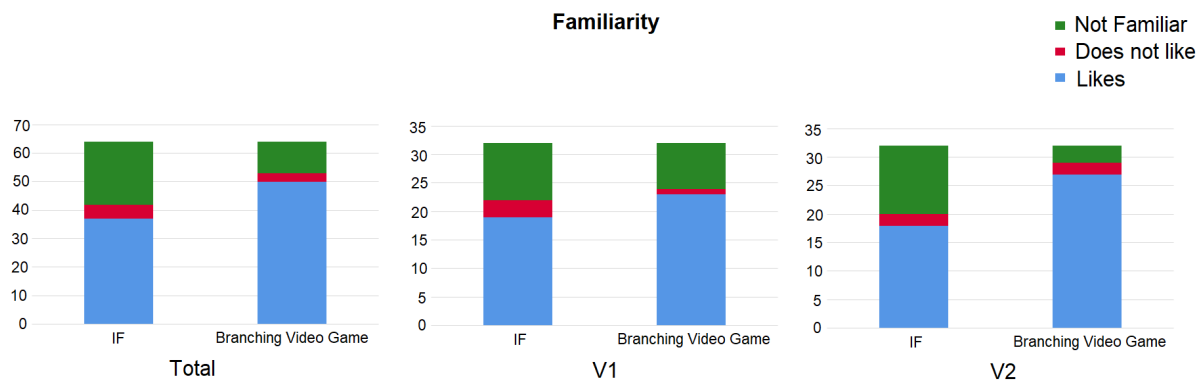
Figure 4.4: Familiarity of branching narratives types of interaction.

In general, the participants gave equal importance both to story and gameplay combined with a majority of 56 participant (87.5%) and the same percentage in both questionnaires. Regarding the familiarity the participants had with IF and video games with branching narratives, although there is a tendency to like and enjoy these type of interactions, in general they are acquainted with branching narratives in the form of a video games rather than with IF environment. With a total of 37 participants (57.6%) who know and enjoy IF and 22 participants (34.4%) who do not know or do not have an opinion, comparing to 50 participants (78.1%) who know and enjoy video games with branching narratives and only 11 participants (17.2%) who do not know or do not have an opinion on that type of interaction. These percentages seem persistent between versions of the narrative, but if we look at difference between versions regarding the familiarity of video games with branching narratives, there is a larger amount of participants who do not know or do not have an opinion in Version 1 (V1), with 8 participants (25%), versus Version 2 (V2), with 3 participants (9.4%). Figure 4.4 shows the familiarity of branching narratives types of interaction.

From those who are familiar with these types of interaction, branching narratives in general, the preference to replay the experience diverged equally, with 29 participants (45.3%) who like to play again versus the same amount of participants who do not like to replay the game after a first playthrough. The same phenomenon is present when looking at each version of the game separately, showing in Figure 4.5. And from those participants who like to replay the experience, the majority tend to choose different options whenever possible to experience different stories, with 36 participants (56.3%) in general as shown in Figure 4.6.

4.4.1.B Regret Analysis

In order to analyse the regret and disappointment reaction the players had after their first playthrough, firstly it was needed to check the normality of the RDS items with a Shapiro-Wilk test. The resulting p
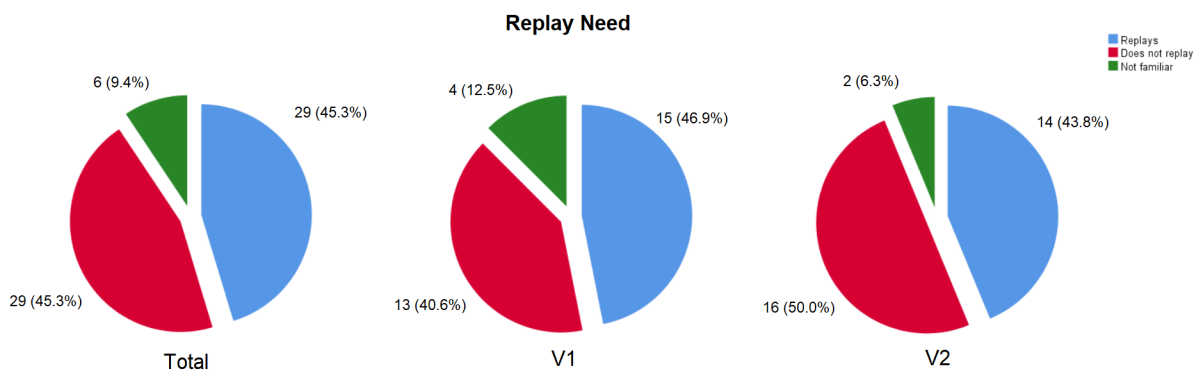
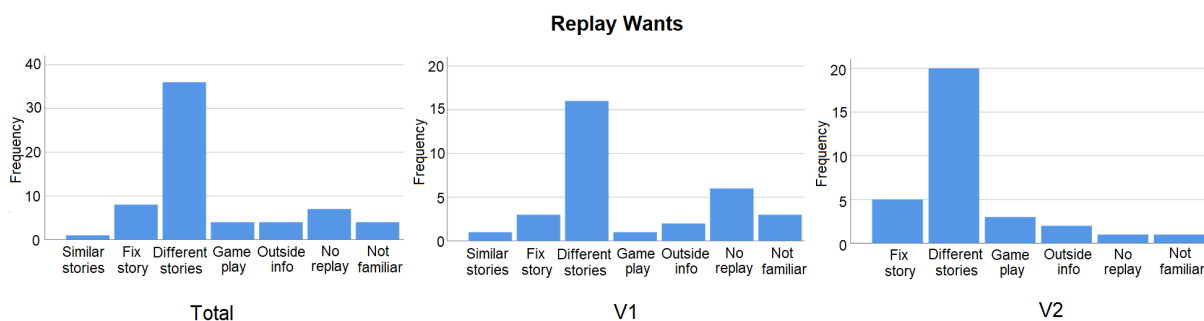**Figure 4.5:** Pie graph of the replay need distribution.

Figure 4.6: Distribution of the motivation players have when replaying a game.

values are listed in Figure 4.3. The data with the p value less then alpha level of 0.05, which rejects the null hypothesis of the Shapiro-Wilk test, are considered not normal distribution, and the one above the alpha level of 0.05 are considered normally distributed. As we can see, the Regret Index has a not normal distribution, while the Affective Reaction and Disappointment Index have a normal distribution.

The items with a normal distribution were analyzed with a parametric test (T Student Sig. (2.tailed)) and the items with a not normal distribution were analyzed with a non parametric test (Mann-Whitney Test). These Independent Sample T tests compare differences between two independent groups in order to determine whether there is statistical evidence that the associated population means are significantly different. Table 4.4 shows the results of these test, the items with their correspondents mean value $\bar{x}$, standard deviation σ, median $\tilde{x}$, the test statistic t or U and the significance value p.

From these values, the most relevant was the Affective Reaction item where the result was ($t(62)$ = 2.361, p = 0.021). Due to the high value of t and since the p value is less than the α value of 0.05 ($p < 0.05$), there is enough evidence to conclude that the values of Affective Reaction between version 1 and version 2 are significantly different, where the values of version 2 are substantially higher than version 1 upon checking on the means of each version, $\bar{x}(V1)$ = 2.031 and $\bar{x}(V2)$ = 2.641 (V1 < V2). We can visually check these differences of the distributions for each item of the RDS in Figure 4.7.

Version	p
Affective Reaction: Normal Distribution	
V1	0.156
V2	0.081
Disappointment Index: Normal Distribution	
V1	0.050
V2	0.138
Regret Index: Not Normal Distribution	
V1	0.007
V2	0.049

**Table 4.3:** Results of the normality tests for the RDS items in the Final Evaluation.

Version	$\bar{x}$	σ	$\widetilde{x}$
Affective Reaction: $(t(62) = 2.361, p = 0.021)$ (V1 < V2)			
V1	2.031	1.114	2.000
V2	2.641	0.944	2.500
Disappointment Index: $(t(62) = 0.481, p = 0.215)$			
V1	1.844	0.818	2.000
V2	1.734	0.992	1.750
Regret Index: $(U = 455, p = 0.434)$			
V1	1.953	0.846	2.000
V2	1.750	1.055	2.000

Table 4.4: Results of the RDS items in the Final Evaluation.
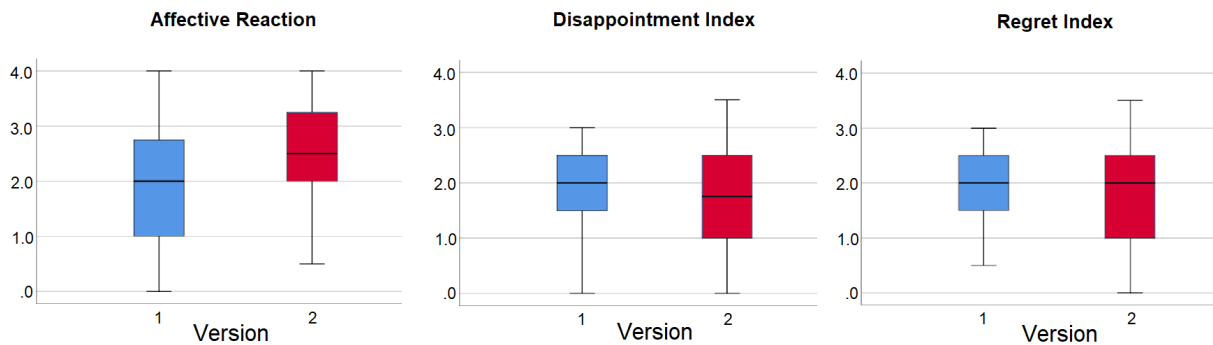
Figure 4.7: Box-plot with the distribution of the RDS items.
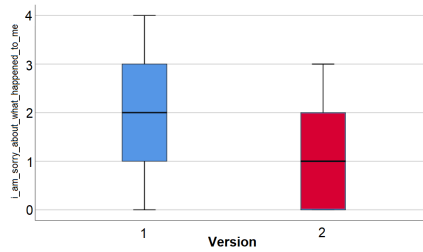
Figure 4.8: Box-plot from the Affective Reaction item *"I am sorry about what happened to me"*.

If we look at each of the statements that the RDS items consist, which all follow a non normal distribution, there is one which stands out. The statement *"I am sorry about what happened to me"*, which is one of the components of the Affective Reaction item, has the following result, (U = 319, p = 0.007). Where the mean value of version 1 is significantly higher than version 2, $\bar{x}(V1)$ = 1.840 and $\bar{x}(V2)$ = 0.910 (V1 > V2). We can visually see this in Figure 4.8.

By comparing both box-plots from the Affective Reaction (Figure 4.7) and from the statement *"I am sorry about what happened to me"* (Figure 4.8), we can see the versions are inverted, meaning in one graph the version 2 is higher than version 1 and in the other graph it is version 1 that is higher than version 2. This happens because the statement *"I am sorry about what happened to me"* is on the negative side of the Affective Reaction spectrum and the results from that had to be inverted. This together with the other statement, *"I am satisfied about what happened to me"*, compose the Affective Reaction item of the RDS.

The significance of both the Affective Reaction and the statement that composes it, persisted when checking for other possible correlations with values that consist the demographic analysis, such as gender, replay need and many others.

After the RDS questions, the players were asked which decision in the narrative they would like to go back and change. These decisions were classified the following way:

- 0 - Would not change any decision (none)

- 1 - Would change the decisions made in the first chapter of the narrative (Tavern decisions)

- 2 - Would change the decisions made in the second chapter of the narrative in the first branch (Mermaid decisions)

- 3 - Would change the decisions made in the second chapter of the narrative in the second branch (Succubus decisions)

- 4 - Would change the decisions made in the third and final chapter of the narrative (Wizard decisions)
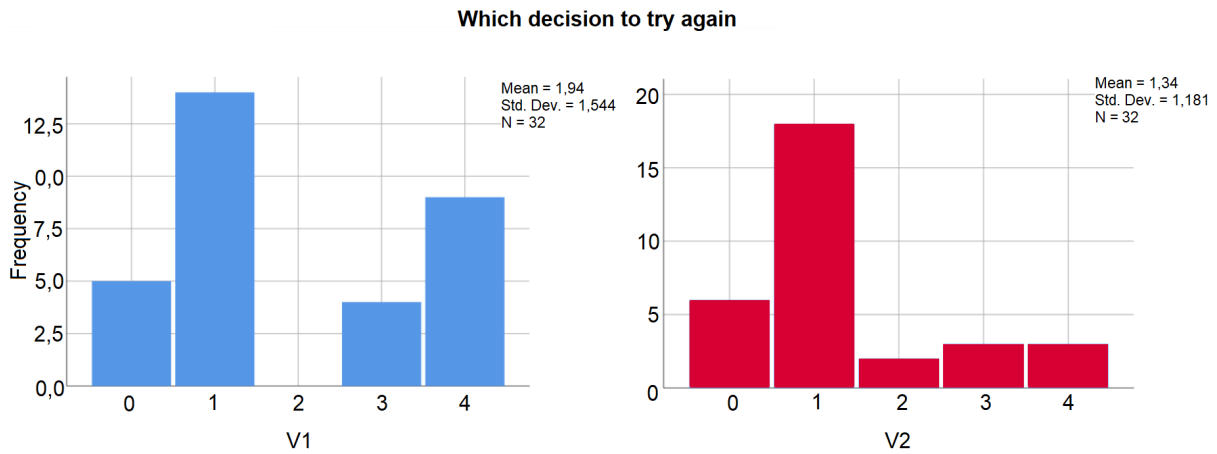
Figure 4.9: Histogram of the distribution of which decisions the player would try again.

Although there was not enough significance to make a solid conclusion that there is a major difference between versions after running a Mann-Whitney test on its not normal distribution, (U = 415, p = 0.159), there is some evidence that there might be a difference between them upon looking at its histograms in Figure 4.9. In version 2 there are clearly less players waiting to change the decision made in the last chapter of the narrative (4 - Wizard decisions) and more wanting to change the decisions made early in the first chapter of the narrative (1 - Tavern decisions).

4.4.1.C   Logging Analysis

The behaviour the players had during gameplay and the tendency of the game's replayability is also important to study. The results were gathered from the logging information. As we can see in Figure 4.10, although there were more playthroughs in version 1 (with two participants playing V1 6 times and one participants playing V1 11 times), the amount of participants playing the game multiple times is more consistently larger in version 2 (2 participants played V1 two times and 10 participants played V2 two times), with less participants playing the game only one time (22 participants in V1 and 15 participants in V2). The box plot on the right also shows this distribution.

There was no found significance between versions regarding from where the players decided to replay the narrative. In both versions the amount of participants that decided to replay the game from chapter 1 and 3 were identical and very similar from chapter 2, as Figure 4.11 shows. The overall tendency in both version of the game is for the participants to want to replay the game from chapter 1 (Tavern Decisions).

There is evidence to say players explore the 3 chapters of the narrative more than one time, and each time they might get a different outcome. In Figure 4.12 we can see all participants had at least one ending and there are less participants in version 2 having only one ending (22 participants in V1 and 16
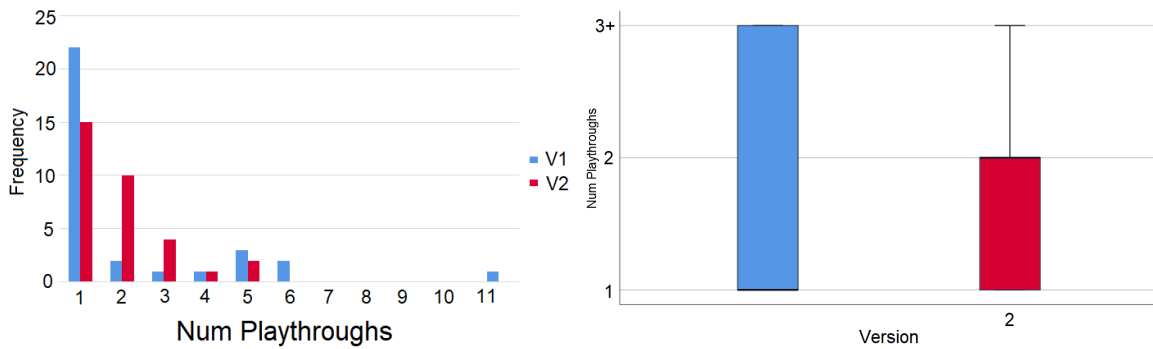
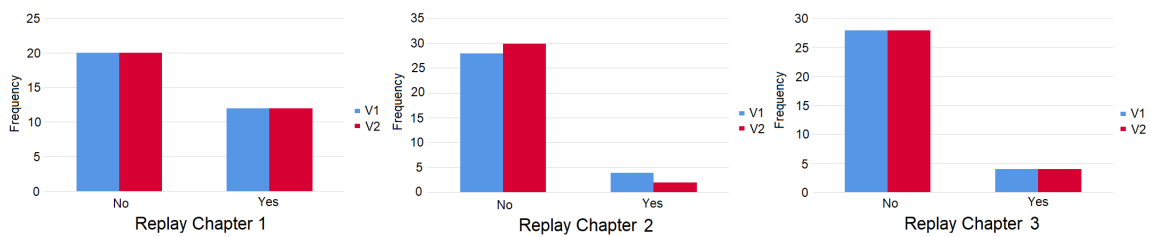**Figure 4.10:** Distribution of the number of playthroughs each player had.

Figure 4.11: Distribution of the number of times participants replay the game from Chapter 1, 2 and 3.

participants in V2). More important to note the cases where there are two or more endings, although there more instances of endings in version 1 than in version 2 (1 participants with 7 outcomes in V1 and 3 participants with 5 outcomes in V2), there are more participants in version 2 having two or more endings than in version 1 (9 participants in V1 and 16 participants in V2), manly more participants with two and 3 endings (2 players in V1 and 10 players in V2 with two endings, 2 players in V1 and 4 players in V2 with three endings) which is substantial difference. This can be explained by the motivation players had to replay the experience, Figure 4.13. As we can see, while in version 2 the population is evenly distributed by the three factors, in version 1 the majority of the participants replayed the narrative due to finding all possible endings.

All these items are not normally distributed and none had enough significance after a Man-Whitney
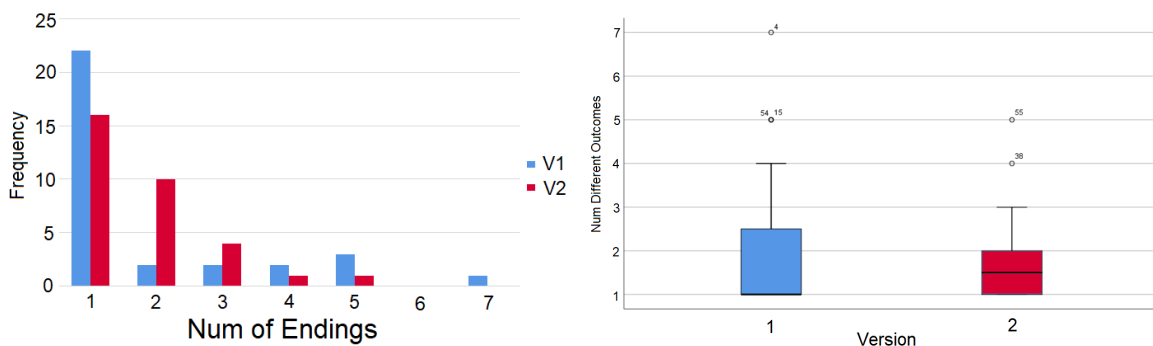
Figure 4.12: Distribution of the number of endings participants had.

55
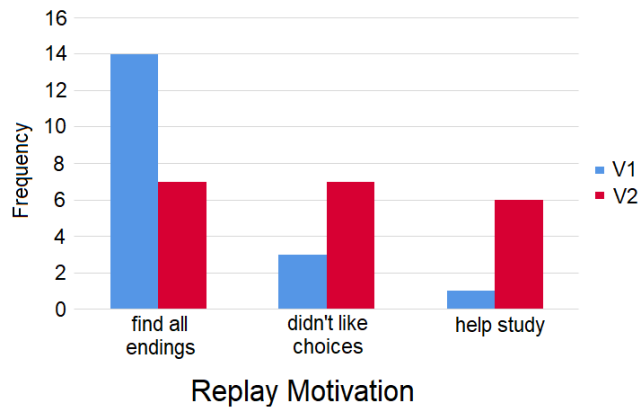
Figure 4.13: Distribution of the replay motivation.

test ($p < 0.05$) when applied to all cases of the study. When selecting cases demographically, it was found a few interesting cases. Such was for the player who consider themselves male, the item for the frequency players replayed the game from chapter 2 and chapter 3 of the narrative, the following result was found after Mann-Whitney test, ($U = 184$, $p = 0.056$). Where the mean value of version 1 is significantly higher than version 2, $\bar{x}(V1) = 0.280$ and $\bar{x}(V2) = 0.050$ (V1 > V2). For the cases of players who do not search for different stories when replaying branching narratives, there was significance whether they replayed it or not, with the result of ($U = 46$, $p = 0.007$). Where the mean value of version 1 is significantly higher than version 2, $\bar{x}(V1) = 0.670$ and $\bar{x}(V2) = 0.170$ (V1 > V2). And consequently, players who do not replay for different stories also had significance for the the number of playthroughs ($U = 47$, $p = 0.005$) and the number of finals players got ($U = 49$, $p = 0.024$), where version 1 is always significantly higher than version 2 (V1 > V2).

4.4.1.D Experience Analysis

Last but not least, the experience from the game was analysed as well as the actions and inactions of the players. The GEQ items were tested for its normality (using the Shapiro-Wilk test) together with the items I created, which were also checked using a Chronbach's Alpha test (as explained in Subsection 4.3), which passed with $\alpha > 0.7$. Again, a T-Student was used to check if each item had and significant difference between version 1 and version 2. There was no significance between the values of version 1 and version 2 of the experience ($p < 0.05$), the result were very similar between each other as the Table 4.5 shows.

Continuing the analysis, some cases were selected demographically to check if there was any significance found regarding the experience players felt. Firstly, for the male gender it was found significance in the one of the GEQ items, *"I felt challenged"*, with the following result, ($U = 155$, $p = 0.040$). Where

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Version	$\bar{x}$	σ	$\widetilde{x}$
Competence: (t(62) = 1.042, p = 0.302)			
V1	1.719	0.975	1.500
V2	1.484	0.818	1.500
Sensory Imaginative Immersion: (t(62) = 0.543, p = 0.589)			
V1	2.016	0.920	2.000
V2	2.156	1.139	2.250
Flow: (t(62) = 0.000, p = 1.000)			
V1	1.614	0.845	1.500
V2	1.614	1.123	1.500
Tension: (U = 447, p = 0.362)			
V1	0.641	0.775	0.500
V2	0.859	0.927	0.750
Challenge: (U = 457, p = 0.45)			
V1	1.094	0.689	1.000
V2	0.953	0.700	1.000
Negative Affect: (U = 510, p = 0.972)			
V1	0.766	0.803	0.500
V2	0.813	0.957	0.500
Positive Affect: (t(62) = 0.471, p = 0.639)			
V1	2.125	0.925	2.000
V2	2.234	0.933	2.000
Choice Perception: (t(62) = 0.190, p = 0.850)			
V1	1.953	0.995	1.750
V2	1.906	0.979	2.000
Narrative Perception: (U= 506,p= 0.935)			
V1	1.422	1.264	1.000
V2	1.344	1.160	1.000
Agency: (U= 456,p= 0.440)			
V1	2.813	0.716	3.000
V2	2.563	1.006	2.500
Action: (U= 443,p= 0.329)			
V1	2.081	1.077	3.000
V2	2.720	1.085	3.000
Inaction: (U= 483,p= 0.683)			
V1	1.880	1.314	2.000
V2	2.030	1.282	2.000

Table 4.5: Results of the GEQ and choice items in the Final Evaluation.

the mean value of version 1 is significantly higher than version 2, $\bar{x}(V1)$ = 1.480 and $\bar{x}(V2)$ = 0.886 (V1 > V2).

Regarding the familiarity the players had with IF, the players who are not familiar and/or do not like this type of interaction had a significant different value in the GEQ item *"I found it tiresome"* between versions, (U = 44, p = 0.009). Where the mean value of version 1 is significantly higher than version 2, $\bar{x}(V1)$ = 0.920 and $\bar{x}(V2)$ = 0.290 (V1 > V2). For the players who like Branching narratives in video games, the item *"I felt challenged"* also had a strong significance, with the results of ($t(48)$ = 2.296, p = 0.026). Where the mean value of version 1 is significantly higher than version 2, $\bar{x}(V1)$ = 1.730 and $\bar{x}(V2)$ = 1.000 (V1 > V2).

When it comes to the replay tendencies players have when playing a branching narrative game, for the ones who do not have a need to replay them in general, there was significance for the Agency item. It had a result of ($t(27)$ = 2.705, p = 0.014), where the mean value of version 1 is significantly higher than version 2, $\bar{x}(V1)$ = 3.038 and $\bar{x}(V2)$ = 2.094 (V1 > V2). To be more precise, the statement *"I felt I was moving the story forward"* which composes the Agency item, in particular has significance, with the result of (U = 49, p = 0.012) $\bar{x}(V1)$ = 2.850 and $\bar{x}(V2)$ = 1.690 (V1 > V2). When it comes to cases of players who want to replay the game more than once, there was significance in the statement of *"I felt irritable"*, with a result of (U = 61, p = 0.029). Where the mean value of version 2 is significantly higher than version 1, $\bar{x}(V1)$ = 0.330 and $\bar{x}(V2)$ = 0.790 (V1 < V2). Also for the statement *"I felt that my choices had consequences"* had the result of ($t(33)$ = 2.371, p = 0.024). Where the mean value of version 2 is significantly higher than version 1, $\bar{x}(V1)$ = 2.160 and $\bar{x}(V2)$ = 2.940 (V1 < V2). Then, for the players who replay branching narrative games in order to experience different stories, there was significance for the GEQ statement, *"I felt challenged"*, with the result of (U = 91, p = 0.022). Where the mean value of version 1 is significantly higher than version 2, $\bar{x}(V1)$ = 1.750 and $\bar{x}(V2)$ = 0.950 (V1 > V2).

For the number of playthrough, the cases where players only played the narrative one time, it was found significance in the GEQ statement *"I found it impressive"*. It had a result of ($t(22)$ = 2.305, p = 0.031), where the mean value of version 2 is significantly higher than version 1, $\bar{x}(V1)$ = 1.210 and $\bar{x}(V2)$ = 2.140 (V1 < V2). For the players who played the game more than 3 times, there were a few GEQ items with significance. Namely the Challenge item with the result of ($t(13)$ = 2.264, p = 0.041), where the mean value of version 1 is significantly higher than version 2, $\bar{x}(V1)$ = 1.333 and $\bar{x}(V2)$ = 0.583 (V1 > V2). And the Tension item with the result of (U = 11, p = 0.043), where the mean value of version 2 is significantly higher than version 1, $\bar{x}(V1)$ = 0.500 and $\bar{x}(V2)$ = 1.667 (V1 < V2). The statement which contributed the most for that result was the *"I felt irritable"*, with result of (U = 11, p = 0.033), again where the mean value of version 2 is significantly higher than version 1 (V1 < V2).

4.5 Discussion

4.5.1 In General

4.5.1.A RDS

From the results gathered, the biggest difference between version 1 and version 2 of the narrative is its Affective Reaction value from the RDS items. Where this value is notably higher for version 2 than for version 1, meaning players felt a more positive emotion (e.g happiness, contempt) towards version 2, and a more negative emotion (e.g. sadness, sorrow) towards version 1. To be more precise, the statement that contributed the most to this result was the *"I am sorry about what happened to me"*, which had a much higher value in version 1. This goes hand in hand with the negative emotion felt in version 1, and can be explained by the fact players in that version did not had the same explanation regarding the outcome of some of their actions/inactions as the players in version 2 had. This might have brought feelings of hopelessness in their choices and sense of not knowing what they could have changed in order to have another outcome or what might have caused it. In contradiction to version 2, where players had feedback towards their inactions, leading them to understand their choices and producing a good feeling of closure. This is a strong positive value, as the games experience was improved not by creating remorse but by showing the path not taken.

When comparing the RDS items from the Preliminary Evaluation with the Final Evaluation, the values are relatively lower in the Final Evaluation as one might expect, since the sample size is much bigger and inclusive of more types of players. Both Regret Index and Disappointment Index had the same result, concluding there were moderately some feelings of both regret and disappointment in the narrative.

4.5.1.B Logging

Results gathered from the logs of players playthroughs of the game showed that there were more participants replaying the game in version 2 with fewer amount of endings. Meanwhile, for version 1, there were more endings, but lesser people achieved it, one or two. This happened because the feedback allowed the players who did not replay the game in order to get different stories to also get interested in replaying the game. In fact, the feedback drew attention from them by showing what could have happen, in their inactions, in order for them to want to play the game again, which would not have happen without it, a very positive point.

4.5.1.C Experience

Regarding the experience players had towards the experience, in the general case, there were not any significant different between versions, as the GEQ items and the action/inaction item had a very similar

value. These items once again had a lower value in the Final Evaluation when comparing with the Preliminary Evaluation, due to the same reason of the sample size being larger and more diversified. Overall the experience of the narrative was classified as moderately positive with a fairly good capacity for agency.

4.5.2 Selected Cases

Although there was not much significant difference in the results obtained from the general sample, it is interesting to note there are two distinct groups of participant within the sample, and when isolated evident results started to show. These groups are what constitutes my target audience of players who appreciate this type of experience, and the rest of the audience who do not like it or never played it.

4.5.2.A Target Audience

Players who enjoy and are familiar with branching narratives in video games and replay them in order to get different stories each playthrough, felt more challenged when playing version 1 of the game when compared to version 2. It might happen due to the fact version 1 does not have as much feedback regarding the choices of player as in version 2, making it harder for the players to understand the branches that the narrative could take, since they enjoy this type of experience.

Then for the players who feel the need to replay this type of games more than once and got to play it three times or more, felt version 2 gave more sense of consequence for their actions rather than in version 1. In addition to that, they also felt more irritable towards version 2 than in version 1. Meaning players noticed the feedback created in version 2 and associated that towards their actions, since they got to play the game multiple times. But perhaps that feedback became repetitive, maybe because reading through the same segments considering the experience was text-based, or maybe these players have a need to complete the game in its entirety and since the feedback kept telling them something they could have done differently might reduce the their experience.

4.5.2.B Other Audience

Now, for the players you do not enjoy interactive fiction or are not familiar with it, there was more sense of tiredness in version 1 when compared to version 2. Meaning players who are not used to play IF got to enjoy more version 2 due to the fact that version 1 has less content making it more bored to play when compared to version 2. The feedback towards their actions added more playability, making it more fun for them when compared to the players who are used to this type of entertainment and get enjoyment just by the traditional approach.

In contrast, the participants who do not feel the need to replay the game after its completion, had a less sense of agency in version 2. As they did not felt they were moving the story forward in version 2 as much as in version 1. Meaning the feedback actually got in the way and reinforced their lack of need to replay the game. This might have to be related to the way feedback is being generated and presented to the players, or because the feedback was always point towards what could have happen differently, which can lower the experience for players who have a tendency to just finish the game.

Regarding the players who do not replay the game in search of different stories in their playthroughs, there was found significant evidence that there where more players playing the narrative only one time in version 1 when compared to version 2. It might have to do with the fact the feedback in version 2 motivated these players to want to replay the game, when the players who want to replay to get different stories already do that for the traditional approach. In addition to that, it was also found that players who do not replay the game to get different stories actually got to replay the game from chapter 1 more often in version 2 than version 1. Again, the feedback might have helped them change their minds, which is also in favor of the approach.

Finally, for the players that played the narrative only one time, found version 2 of the game more impressive than version 1. It might be because the feedback helped improve the experience of the game when played once, since it might become annoying to read through the same segments more times when the study was conducted in a text-based interface.

4.6   Post-Evaluation

Aside from the evaluation at hand, it was presented to me a chance to be apart of a podcast and give a presentation on storytelling and branching narratives in video games. This opportunity was given to me upon reaching to the *Grupo de Roleplayers de Lisboa* by Bruno Ribeiro and Daniel Carvalho from *Elemento Associação Ludopedagógica*[7]. The podcast called *"Braching Narratives: A história dentro da história -storyseption-"* and it took place in a Discord chat room where anyone interested could join using following link: . This presentation allow me to teach the audience about branching narratives, ask them to participate in the study and at the end there was a discussion section which allowed me to gather extra feedback. The recording of this podcast can be found on Youtube by the following link: https://youtu.be/uAQD5mgoQRc.

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[7]Elemento Associação Ludopedagógica, Facebook group homepage https://www.facebook.com/elemento20

5

Conclusion

Contents

Research was done towards accessing the possibility of motivating players to replay a branching narrative video game by bringing attention to the storytelling of the actions and inactions they make throughout the game. This came to solve the issue of being hard for the player to understand the proportions a branching narrative could take and which choices were crucial for the unfolding of their experience. Since it's only when the consequences of the choices are presented to the players that they start to think about them, wondering of what could have happened differently.

In order to demonstrate it, a text-based game was developed with two versions of the same narrative to make a comparison and see if there was a significant distinction in the replay value. After some research was done in the field of storytelling and psychology of regret, the narrative was written and appropriated with feedback every time a decision blocks a branch of the narrative. Using Twine editor, I developed a system that generates consequences for the actions and inactions that each decision provides, making sure the resulting narrative was short but with a vast range of possible outcomes and without disregarding the experience of the players.

To put the narrative to the test, firstly a preliminary evaluation was conducted with a small group of participants. Then, after some changes, the final evaluation with a larger group of participants was made, which managed to gather the information needed to assess the veracity of my hypothesis. Players got to play the text-based game and it was evaluated on three distinct levels. The first was the amount of regret players felt towards their first playthrough of the game and where would they change, using the RDS to do that. Second, the number of playthroughs players had and from where they chose to replay the game if they did so, by using logs in the game. And last, the experience of the game, using the GEQ items, plus the perception players had towards their choices and the narrative. The results were carefully analysed using the SPSS tool and compared between versions, to which players got randomly assigned to.

In the general case, the results did not have enough significance for the majority of the items evaluated, especially for the regret players felt in their inactions and for the number of playthroughs which were expected to be higher. Even so, there was one significant result taken from this experiments, which unexpectedly, is the improvement of the affective reaction players felt towards the narrative. So, it is concluded that although highlighting the path not taken in a storytelling video game through regret did not made players want to replay the game, in a general sense. It did improve the experience of the game and the feelings players had towards it were more positive by reinforcing and understanding their inactions, which in turn added replay value. For it's not only about the amount of times a player plays the game, but the general feeling they have towards the narrative.

The real significant results were found when studying selected cases. Namely for audience which did not like or who are not used to this type of game and do not usually replay the game, result showed it was possible to change their preferences. Meaning they got to play it more while find it less tiresome and

more impressive. For the players who are considered to be the target audience, results also proved it was less challenging for them and, possibly, less challenging for them to know where to change their actions for future playthroughs. On the negative side, the text-based experience might have caused players to be more irritable and with less sense of agency, because it is a difficult medium to convey feedback and immersion. So it is possible to conclude, the feedback of the inactions did add replay value to each type of player in a different way, but further research is needed to understand these evidences and explore different mediums.

I've learn a lot throughout this experiment, specially being able to study the interesting field of storytelling and game design which I feel motivated by. Game design always tries to reinvent new ways to convey emotion and new experiences to the players, the results brought by this experiment clearly bring value as an experimental purpose to improve the affective reaction in the storytelling of the players actions and inactions.

5.1   Future Work

Based on these conclusions, further research is needed to determine the exact causes of the significance found from the affective reaction and the GEQ items between versions. There is found evidence, but there could be more investigation dedicated towards each result taken in order to obtain a more solid conclusion.

To better understand the implications of these results, future studies could focus on what types of feedback there are, how to use them and which ones produce more impact for the player. This could be done by exploring the medium in which the experiment was done. For example switching the text-based platform for a more immersive one, such as a 2D or 3D video game. Then, evaluate how the players responded to it, would there be any changes, positive or negative. The way players perceived the feedback and how it is conveyed is different from platform to platform, such as, animations, visual effects, sounds, voice over with dialog and music.

Finally, it would be interesting to see the evolution of the game's narrative and making it come to live in a video game format. The storytelling could be extended and some dialog choices could be improved with added gameplay mechanics to make it more playable, as well as a graphic representation could make it more appealing for the player to experience it.

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A

"The Ballad Of The Wizard and Sacrifice"

Use these links to access both versions of the game:

"The Ballad Of The Wizard and Sacrifice" - Version 1

"The Ballad Of The Wizard and Sacrifice" - Version 2

Listing A.1: Passages of the narrative without the generation of feedback (V1)

```
1  :: Passagem sem titulo
2  <h2>'The Ballad Of The Wizard and Sacrifice'</h2>
3  This is a prototype of the narrative for a game that is currently being devoloped by Susana Ga
4  ---
5  [[Stop the performance immediately and pretend the show was already over|Stop the show]]
6  [[Try to restart the song|Show must go on]]
7
```

8 :: Bardos Party

9 You then try and talk to one of the bards that there is something wrong in the High Mountain t

10 - "Bob, the music box builder who nobody seems to find, is also been told has disappeared in t

11 - "Fine, lead the way Bard! Show us how you have nothing to do with this.", the head of the gr

12 ---

13 (if: $version2 is true)[[[You head into the High Mountain with The Rolling Boulders|No Home (F

14 (if: $version2 is false)[[[You head into the High Mountain with The Rolling Boulders|Montanha]

15 [[Look around the tavern|Taverna]]

16 [[Walk around the tavern|Taverna2]]

17 (if: $noFisherman is true)[[[Go to the bar|No Pescador3 (Feedback)]]]

18 (set: $party to "bards")

19

20 :: Pescador

21 A strange man comes closer. Light blond, curly hair hangs over a bony, tense face. His clothin

22 (if: $showMustGoOn is true)[- "Dear Sir. What happen to you, I've seen it somewhere else. To m

23 - "Would you mind joining me for a round?", he asked after he jugged all the content he had in

24 Behind the counter is who you would assume to be the bartender, a fat, but muscular half-elf w

25 - "Another round?! Look friend I will not clean your mess again. He will be your responsibilit

26 ---

27 (if: $version2 is true)[[[You don't have time to babysit|No Fisherman (Feedback)]]

28 [[Join the fisherman|No Bards2 (Feedback)]]]

29 (if: $version2 is false)[[[You don't have time to babysit|Taverna]]

30 [[Join the fisherman|Pescador Party]]]

31 (set: $talkfisherman to true)

32

33 :: Pescador Party

34 The man at the bar strikes conversation with you. He introduces himself as Rob Graethan, a pro

35 - "Another round it is!", the fisherman says as the barman pour you some ale in a old dirty mu

36 After a few drinks, he goes on about how he fell in love with a beautiful maiden he met on the

37 - "Every night she would sing for me a beautiful lullaby. I think I'm lost without her. Oh I s

38 - "Bard, please, you've got to help me, help me find my beloved. We need to go to the shore!"

39 ---

40 (if: $version2 is true)[[Leave The Wizard and Sacrifice and head towards the shore|No Home (Fe

41 (if: $version2 is false)[[Leave The Wizard and Sacrifice and head towards the shore|Praia]]

42 [[Look around the tavern|Taverna]]

43 [[Walk around the tavern|Taverna2]]

44 (if: $noBards is true)[[[Go check on the barmaid|No Bards3 (Feedback)]]]

45 (set: $party to "pescador")

47 :: Montanha

48 You leave The Wizard and Sacrifice tavern and head towards the High Mountain, visible through

49 It's getting cool as you get there. The sun is setting over the mountain side. There are a cou

50 You enter it.

51 Beyond the broken statue lies a massive, dank room. It's covered in dead vermin, puddles of wa

52 ---

53 [[Search the room|Dungeon]]

54 (if: $version2 is true)[[[Continue down the hall|No Succubus (Feedback)]]]

55 (if: $version2 is false)[[[Continue down the hall|Caminho Montanha]]]

56 (set: $presenteBob to false)

57

58 :: Praia

59 It's pleasant and warm. Clouds hang overhead, resembling a thick fog clinging to the horizon,

60 In the superficial waters of a steady ocean lies the wreckage of the Aglaia, once a trading sh

61 There is no evidence of Mary anywhere but there are various personal belongings, crates and ch

62 ---

63 (if: $version2 is true)[[[Investigate the tracks and footprints|No Sereias (Feedback)]]]

64 (if: $version2 is false)[[[Investigate the tracks and footprints|Gruta]]]

65 [[Search inside the crates|Caixas]]

66 [[Look at the shipwreck|Sereias]]

67

68 :: Caminho Montanha

69 You proceed onwards, deeper into the dungeon's secrets. You pass many rooms and passages, most

70 ---

71 [[Get inside the door|Feiticeiro]]

72 [[Look at the inscriptions|Porta Descricao]]

73 (if: $noSuccubus is true)[[Go back to the room|No Succubus2 (Feedback)]]

74 (if: $bardPreso is true)[[Go back to the room|No Succubus2 (Feedback)]]

75 (if: $party is "bards")[[[Search for The Rolling Boulders|Procurar Bardos]]]

76

77 :: Succubus

78 You try to have a better look at this beautiful charming creature, she lures you in like you a

79 - "Look what we have here, another treat I have. Care to make me company?", she whispers with

80 As you come closer, inside the dark cave you see a pile of bones scattered through the wet sto

81 Beyond the murky cave lies a tied man with a terrifying face.

82 - "Please excuse me, Bard. Help out a person in need.", he says.

83 - "My name is Bob and as you can see these lands have been corrupted. For the longest time we

84 - "And I was the one who saved him. He his now my little thing to play with, and soon you will

85 ---

86 [[How about I sing you a song?|Negocio Succubus]]

87 [[Try to escape|Succubus room]]

88 (if: $party is "bards")[[[Where are my friends?|Succubus room]]]

89

90 :: Feiticeiro

91 Finally you arrive to the top of the High Mountain. There stands a tall handsome man wearing r

92 - "I have been waiting for you, you are quite the bard.", he says in a very weird voice..

93 - "My name is Everit Soulton, a powerfull wizard. And yes this is my voice, and this is my mag

94 Slender braziers at the bottoms of each of the fourteen obsidian columns light up the lower le

95 - "All my life I wish I had a beautiful voice like yours. All my life people have made fun of

96 ---

97 [[Look at the throne|Trono]]

98 [[Observe the gramophone|Gramofone]]

99 [[Inspect the cage|Jaula]]

100 [[Look at the trolls|Trolls]]

101 (if: $party is "bards")[[[Make a deal with the wizard|Decisoes Bards]]]

102 (if: $party is "pescador")[[[Make a deal with the wizard|Decisoes Pescador]]]

103

104 :: Negocio Succubus

105 You quickly pick up your lute and think of a song to sing to her. Wich song will you sing?

106 ---

107 [['My Love Deeper Than the Sea'|Musica Romantica]]

108 [['Drunken Fisherman'|Musica de Festa]]

109 [['The Moon Lullaby'|Bob]]

110

111 :: Bob

112 'The Moon Lullaby', you remember it from when you mother used to sing to you during bedtime. I

113 You set Bob free, and you both can now leave that room away from the creature's danger.

114 - "Hero, please go there and get rid of them before he taints everything, get rid of those hei

115 -"In order for you to succeed and as a reward for setting me free I give you a piece of my lat

116 It is the most precious lute you have ever seen in your life. Carved from the best wood, mahog

117 ---

118 [[Continue down the dungeon's hall|Caminho Montanha]]

119 (set: $presenteBob to true)

120

121 :: Stop the show

122 You quickly understand that something bad is going on. This isn't you who lost your voice and j

123 Rapidly you put on your happy face and charmingly give a big bow to your audience while try no

124 ---

125 [[Leave the stage|Taverna]]

126 (set: $stopTheShow to true)

127

128 :: Show must go on

129 You anxiously try to continue the ballad as if nothing happen. No matter how much you try, no

130 Your crowd is no longer happy and they seem very disturbed. Suddenly, sound is restored just i

131 ---

132 [[Leave the stage|Taverna]]

133 (set: $showMustGoOn to true)

134

135 :: Bardos

136 As you aproach the bairdmaid, you realise who are around her. A local bardic group ex-colleague

137 - "So, cat bit your tongue? Can't no longuer finish your crappy song?!", one of them says.

138 (if: $version2 is true)[(if: $showMustGoOn is true)[- "What a stupid douche, why didn't you ju

139 ---

140 (if: $version2 is true)[[[You try and prove them wrong, saying it wasn't your fault|No Pescado

141 [[You flip them the finger and go on your way|No Bards (Feedback)]]]

142 (if: $version2 is false)[[[You try and prove them wrong, saying it wasn't your fault|Bardos Pa

143 [[You flip them the finger and go on your way|Taverna]]]

144 (set: $talkbards to true)

145

146 :: Taverna

147 The tavern itself is packed. Soldiers seem to be the primary clientele here, which often indic

148 Even most of the stools at the bar are occupied, though nobody seems to mind more company.

149 Some idiot is having an agitated night. His friends are loud and obnoxious harassing the barma

150 ---

151 (if: $party is "alone")[(if: $noFisherman is false)[(if: $talkfisherman is false)[[[Go to the

152 (if: $noFisherman is true)[[[Go to the bar|No Pescador3 (Feedback)]]]

153 (if: $noBards is true)[[[Go check on the barmaid|No Bards3 (Feedback)]]]

154 (if: $party is "alone")[(if: $noBards is false)[(if: $talkbards is false)[[[Go check on the ba

155 [[It has been a rough day, time to go home sleep and forget what happened today|Final1 Pregu[U+1

156 [[Look around|Taverna]]

157 [[Walk around|Taverna2]]

158 (if: $version2 is true)[(if: $party is "pescador")[[[Leave The Wizard and Sacrifice and head t

159 (if: $version2 is false)[(if: $party is "pescador")[[[Leave The Wizard and Sacrifice and head

160 (if: $version2 is true)[(if: $party is "bards")[[[You head into the High Mountain with The Rol

161 (if: $version2 is false)[(if: $party is "bards")[[[You head into the High Mountain with The Ro

162 ---

163 :: Luta Sereias

164 As soon as the water creatures see the fisherman getting ready to battle, they get hysterical,

165 There was a fight.

166 The fisherman, clearly outnumbered, wasn't going to give up in order to find the love of his l

167 ---

168 (if: $version2 is false)[[[Investigate the tracks and footprints|Sereias Mortas (Feedback)]]]

169 (if: $version2 is true)[[[Investigate the tracks and footprints|Gruta]]]

170 [[Search inside the crates|Caixas]]

171 (if: $sereiasNo is true)[[[Look at the shipwreck|No Sereias2 (Feedback)]]]

172

173 :: Falar Sereias

174 You don't feel right about this, and need to know more about the situation. You put yourself i

175 ---

176 [[Tell them you are looking for a maiden.|Presente Sereias]]

177 [[Tell them you also hate humans, especially The Rolling Boulders.|Luta Sereias2]]

178 [[They can not kill you because you are famous.|Luta Sereias2]]

179 (set: $falarSereias to true)

180

181 :: Gruta

182 A wide overgrown boulder in a shadowy mountain range marks the entrance to this dungeon. Beyon

183 Further ahead are two paths, you take the right. Its twisted trail leads passed long lost room

184 ---

185 (if: $sereiasMortas is true)[[[Go talk to the mermaids|Sereias Mortas2 (Feedback)]]]

186 [[Continue|Caminho Montanha]]

187

188 :: Presente Sereias

189 You put on your most charismatic face and you tell the mermaids all about the fisherman's ques

190 - "Mary?!", the head of the tribe asks.

191 - "That is our sister! I told her not to trust humans, and look what happened! He took her, th

192 - "Bard, please go there and get our sister back, I beg you. In order for you to succeed I giv

193 The necklace has a Tiger's Eye gem with a heart cut and the size of a hazelnut, it is in great

194 ---

195 [[Investigate the tracks and footprints|Gruta]]

196 [[Search inside the crates|Caixas]]

197 (set: $presenteSereias to true)

198

:: Final1 (Pregui[U+FFFD]so)

You go home because you are very lazy.

The realm of Fricraft is doomed and fallen to ruines.

All sound and happiness was completely removed.

There is nobody to sing this story because there is no sound.

:: Decisoes Bards

- "Very well Bard, I has I can tell you are not very found of these friends of yours, and they

---

[[Accept the deal|Final5 (Virar Mau)]]

[[Offer yourself as sacrifice in their place|Final6 (Heroi bardos)]]

(if: $presenteBob is true)[[Challange the wizard to a music battle|Final7 (Vence Batalha)]]

(if: $presenteBob is false)[[Challange the wizard to a music battle|Final12 (Perde Batalha)]]

:: Decisoes Pescador

- "Very well bard, as I can see you have brought the mermaid's love. I bet he would do anythin

- "I will gladly offer myself!", the fisherman says.

[[Let the fisherman sacrifice himself.|Final2 (Pescador Sacrificio)]]

(if: $presenteSereias is true)[[[Offer yourself instead of the fisherman|Final3 (Pescador e Se

(else:)[[[Offer yourself instead of the fisherman|Final4 (Pescador)]]]

:: Final2 (Pescador Sacrificio)

You allow the fisherman to sacrifice himself for the love of his life.The trolls grab the fish

- "No please no! Please Bard, let him stay with me!", she cries and they gave their last kiss.

The wizard lets you go with the mermaid.

The realm of Fricraft is saved for now.

You don't know what will happen to all sound and happiness in the future.

The mermaids are happy with the return of their sister, even tho she herself is not.

You are left to sing a song about this story.

:: Final3 (Pescador e Sereia)

You offer yourself instead of the fisherman.

- "NO! I will not allow it, I should be the one to save my beloved Mary.", the fisherman says

- "Shut up! The Bard is mine! You will be quite the addition to my collection AHAHAHAH!", he s

The trolls grab you and put you in the mermaids place. The mermaid is now back the arms of her

- "Thank you Bard!", she says and they give a long passionate kiss.

77

236 You now remember about the gem that the mermaid gave you. You equip the necklace which grants

237 — "OH NOOOO! My beautiful creation!", the wizard runs to the broken gramophone while crying.

238 You manage to run away with the fisherman and Mary. They live happily together.

239 The wizard doesn't have is power anymore.

240 The realm of Fricraft is saved for now.

241 You don't know what will happen to all sound and happiness in the future

242 The mermaids are happy with the return of their sister.

243 You live to sing about this story.

244

245 :: Final4 (Pescador)

246 You offer yourself instead of the fisherman.

247 — "NO! I will not allow it, I should be the one to save my beloved Mary.", the fisherman says

248 — "Shut up! The Bard is mine! You will be quite the addition to my collection AHAHAHAH!", he s

249 The trolls grab you and put you in the mermaids place. The mermaid is now back the arms of her

250 — "Thank you Bard!", she says and they give a long passionate kiss.

251 All you can feel is pain.

252 The wizard lets the fisherman go with the mermaid and they lived happily together.

253 The realm of Fricraft is saved for now.

254 You don't know what will happen to all sound and happiness in the future.

255 The mermaids are happy with the return of their sister.

256 You are a true hero, unfortunately there is nobody to sing this story.

257

258 :: Final5 (Virar Mau)

259 You accept the wizards offer and join him in the dark side. The trolls grab The Rolling Boulde

260 — "No please no! Please Bard, we take back what we said about you!", they cry and yell.

261 They are sacrificed, as you laugh at them.

262 All realm of Fricraft is doomed and fallen to ruines.

263 You will be forever singing the song of this tale to your master wizard and trolls who now ado

264

265 :: Final6 (Heroi bardos)

266 You offer yourself instead of your friends.

267 — "Thank you Bard, we need to get out of here!", they say running away.

268 — "See, they don't care about you. But you are mine now! You will be quite the addition to my

269 The trolls grab you and put you inside of a cage just like the mermaid. The mermaid is set fre

270 All you can feel is pain.

271 The wizard lets the bards go.

272 The realm of Fricraft is saved for now.

273 You don't know what will happen to all sound and happiness in the future.

274 The mermaid is back at the ocean.

275 The The Rolling Boulders live to sing the song about this story.

276

277 :: Final7 (Vence Batalha)

278 - "You dare challenge me to a music battle?! You will regret it...TROLLS! TURN IT ON!", the wi

279 All the trolls run clumsily to spin the gramophone mechanism. It starts to work as you can hea

280 - "How do you like my voice now!?", he says.

281 Now is the best opportunity to use the beautiful crystal lute Bob gave you. But this is not an

282 - "NOOOOOOOOOOOO!! I don't want to die with this horrible voice!", he screams while dying an a

283 The Rolling Boulders all cheer for you and thank you for saving their lives. You are a true he

284 The realm of Fricraft is saved.

285 All sound and happiness are completely restored.

286 You and the bards all live to sing about this story.

287

288 :: Sereias

289 Emerging from the coast there are some aquatic female humanoids with the lower body of a fish,

290 - "MONSTERS!", the fisherman immediately yells.

291 - "All humans shall perish and face vengeance!", the head of the tribe, a female looking merma

292 - "Stand behind me, I will protect you Bard!", the fisherman says while drawing a steel harpoo

293 ---

294 [[Let the fisherman protect you.|Luta Sereias]]

295 [[Hide behind some crates.|Luta Sereias]]

296 [[This smells fishy, I need to talk to them.|Falar Sereias]]

297 (set: $sereiasDone to true)

298

299 :: Dungeon

300 Further ahead are two paths, but the left is a dead end. Its twisted trail leads passed lost t

301 Up ahead, you see an angry beautiful bat winged female humanoid creature with big horns.

302 (if: $party is "bards")[The Rolling Boulders start to shiver:

303 - "That creature looks like the Devil, I don't want to die like this!", the head of the group

304 The rest of the group not knowing what to do, followed him, running.]

305 ---

306 (if: $version2 is true)[[[Run like them|Bob Preso (Feedback)]]]

307 (if: $version2 is false)[[[Run like them|Caminho Montanha]]]

308 [[Approach the creature|Succubus]]

309

310 :: Bob Preso (Feedback)

311 <b>You run away from that room as fast as possible...but...wait...you can hear a long crying m

312 - "He will be mine forever! Unless he dies like the others.", the evil creature laughs with an

313 ---

314 [[Continue|Caminho Montanha]]

315 (set: $bobPreso to true)

316

317 :: No Succubus (Feedback)

318 <b>You step outside that room and.. wait.. you hear a loud bang in the distance from which you

319 ---

320 [[Continue|Caminho Montanha]]

321 (set: $noSuccubus to true)

322

323 :: Succubus room

324 You look around but the beast is blocking the way out. There is no sign of you bard friends, a

325 ---

326 [[How about I sing you a song?|Negocio Succubus]]

327 [[Try to escape|Succubus room]]

328 [[Where are my friends?|Succubus room]]

329

330 :: Porta Descricao

331 You don't understand them.

332 ---

333 [[Get inside the door|Feiticeiro]]

334 [[Look at the inscriptions|Porta Descricao]]

335 [[Search for The Rolling Boulders|Procurar Bardos]]

336

337 :: Procurar Bardos

338 You seem to have lost them. You look around the room, but you can't see them anywere, all that

339 ---

340 [[Get inside the door|Feiticeiro]]

341 [[Look at the inscriptions|Porta Descricao]]

342 [[Search for The Rolling Boulders|Procurar Bardos]]

343

344 :: Musica Romantica

345 You clear your throat and start to sing 'My Love Deeper Than the Sea' with a seductive voice. '

346 - "Oh my... This is the most beautiful thing someone has ever done for me. I love you too bard

347 ---

348 [[Continue|Final11 (Morreu)]]

349

```
350  :: Musica de Festa
351  The Succubus hates your music so much she throws you out of the room herself.
352  ---
353  (if: $version2 is true)[[[Continue down the dungeon hall|Bob Preso (Feedback)]]]
354  (if: $version2 is false)[[[Continue down the dungeon hall|Caminho Montanha]]]
355
356  :: Final11 (Morreu)
357  You died inside the dungeon along side Bob.
358  The realm of Fricraft is doomed and fallen to ruines.
359  All sound and happiness was completely removed.
360  There is nobody to sing this story.
361
362  :: Taverna2
363  As walk inside the tavern, you can hear the loud commotion. The smell of roasted meats and ale
364  ---
365  (if: $party is "alone")[(if: $noFisherman is false)[(if: $talkfisherman is false)[[[Go to the
366  (if: $noFisherman is true)[[[Go to the bar|No Pescador3 (Feedback)]]]
367  (if: $noBards is true)[[[Go check on the barmaid|No Bards3 (Feedback)]]]
368  (if: $party is "alone")[(if: $noBards is false)[(if: $talkbards is false)[[[Go check on the ba
369  [[It has been a rough day, time to go home sleep and forget what happened today|Final1 (Pregui[U+1
370  [[Look around|Taverna]]
371  [[Walk around|Taverna2]]
372  (if: $version2 is true)[(if: $party is "pescador")[[[Leave The Wizard and Sacrifice and head t
373  (if: $version2 is false)[(if: $party is "pescador")[[[Leave The Wizard and Sacrifice and head t
374  (if: $version2 is true)[(if: $party is "bards")[[[You head into the High Mountain with The Rol
375  (if: $version2 is false)[(if: $party is "bards")[[[You head into the High Mountain with The Ro
376
377  :: Luta Sereias2
378  The creatures laugh at your face while getting closer.
379  - "Like i said before Bard, stand behind me!", the fisherman says while drawing a steel harpoo
380  - "I could've ended this faster."
381  ---
382  [[Let the fisherman protect you.|Luta Sereias]]
383  [[Hide behind some crates.|Luta Sereias]]
384
385  :: Trono
386  A lavish throne of bronze sits in front of a giant painting of the wizard himself and is adjoi
387  (if: $party is "bards")[At each one of these seats there is one of The Rolling Boulders tied u
```

388 - "These are your friends? AHAHAH, the wizard laughs evily."

389 - "Please save us bard!", they yell.]

390 The throne is covered in hundreds of elaborate designs and fixed on each of the rear legs is a

391 ---

392 [[Observe the gramophone|Gramofone]]

393 [[Inspect the cage|Jaula]]

394 [[Look at the trolls|Trolls]]

395 (if: $party is "bards")[[[Make a deal with the wizard|Decisoes Bards]]]

396 (if: $party is "pescador")[[[Make a deal with the wizard|Decisoes Pescador]]]

397

398 :: Gramofone

399 The gramophone is a very unique piece of hardwood, carved by the most skilled craftsman. It ha

400 - "I use the girl's voice, a powerful one might I add. Then this gramophone allows me to drain

401 - "Get back to work you stupid troll!"

402 ---

403 [[Look at the throne|Trono]]

404 [[Inspect the cage|Jaula]]

405 [[Look at the trolls|Trolls]]

406 (if: $party is "bards")[[[Make a deal with the wizard|Decisoes Bards]]]

407 (if: $party is "pescador")[[[Make a deal with the wizard|Decisoes Pescador]]]

408

409 :: Jaula

410 Mary the mermaid, makes for a sorrowful sight, especially from a distance. Like a caged animal

411 (if: $party is "pescador")[The fisherman is extremaly furious.

412 - "Mary!!! I will save you, and kill this evil wizard!"

413 - "Like you could! AHAHAH, the wizard laughs evilly and snaps his fingers,

414 ---

415 [[Look at the throne|Trono]]

416 [[Observe the gramophone|Gramofone]]

417 [[Look at the trolls|Trolls]]

418 (if: $party is "bards")[[[Make a deal with the wizard|Decisoes Bards]]]

419 (if: $party is "pescador")[[[Make a deal with the wizard|Decisoes Pescador]]]

420

421 :: Trolls

422 These trolls are scattered all around the hall. Their deceptively thin bodies had thick, rubbe

423 "Work work work work.", it is all they could say with a stupid look on their faces.

424 ---

425 [[Look at the throne|Trono]]

```
426  [[Observe the gramophone|Gramofone]]
427  [[Inspect the cage|Jaula]]
428  (if: $party is "bards")[[[Make a deal with the wizard|Decisoes Bards]]]
429  (if: $party is "pescador")[[[Make a deal with the wizard|Decisoes Pescador]]]
430
431  :: Final12 (Perde Batalha)
432  - "You dare challenge me to a music battle?! You will regret it...TROLLS! TURN IT ON!", the wi
433  All the trolls run clumsily to spin the gramophone mechanism. It starts to work, you can hear
434  - "How do you like my voice now!?", he says.
435  You equip your crappy lute and hope for the best. You start the play the chords but unfortunat
436  - "You lost, Bard! You will be quite the addition to my collection AHAHAHAH!", he says.
437  The trolls grab you and put you and The Rolling Boulders one by one, and put you inside of a c
438  - "No please no!", they cry and yell. Then all you can feel is pain.
439  The realm of Fricraft is doomed and fallen to ruines.
440  All sound and happiness was completely removed.
441  There is nobody to sing this story.
442
443  :: Caixas
444  The boxes are empty.
445  ---
446  (if: $version2 is true)[[[Investigate the tracks and footprints|No Sereias (Feedback)]]]
447  (if: $version2 is false)[[[Investigate the tracks and footprints|Gruta]]]
448  [[Search inside the crates|Caixas]]
449  (if: $sereiasDone is false)[[Look at the shipwreck|Sereias]]
```

Listing A.2: Feedback passages of the narrative (V2)

```
1  :: No Fisherman (Feedback)
2  <b>As you step back from the bar you can see the fisherman getting more and more emotional. Hi
3  He drinks all the content of the mug and the bottle next to it. Then he completly pass out, hi
4  ---
5  [[Continue|Taverna]]
6  (set: $noFisherman to true)
7
8  :: No Home (Feedback)
9  <b>As you leave the tavern you sense something evil coming in your way. You think to yourself
10  ---
11  (if: $party is "pescador")[[[Continue|Praia]]]
```

```
12  (if: $party is "bards")[[[Continue|Montanha]]]

13

14  :: No Bards (Feedback)

15  <b>They did not like that. One of the bards gets his lute and stands on top of one light wooden

16  - "Attention everyone! We are The Rolling Boulders and we are here to give you a better show t

17  ---

18  [[Continue|Taverna]]

19  (set: $noBards to true)

20

21  :: Sereias Mortas (Feedback)

22  <b>As the water creatures die, you can hear the head of the tribe struggling while yelling:

23  - "All you humans are the same! Mary should have never trusted you fisherman!"</b>

24  ---

25  [[Continue|Gruta]]

26  (set: $sereiasMortas to true)

27

28  :: No Pescador2 (Feedback)

29  <b>While you were talking to the bards, at the bar there was an accident. Behind the counter i

30  - "I need help fixing it. You, fisherman, come here!", the half-elf yells while the blonde man

31  ---

32  [[Continue|Bardos Party]]

33  (set: $noFisherman to true)

34

35  :: No Bards2 (Feedback)

36  <b>The half-elf looks like is searching for someone, maybe the barmaid...Oh no...you remember

37  You seen them leave through the back door while dragging her violently.</b>

38  ---

39  [[Continue|Pescador Party]]

40  (set: $noBards to true)

41

42  :: No Sereias (Feedback)

43  <b>You follow the footsteps that lead into a cave and.. wait..you hear a loud bang in the dist

44  The Aglaia is now sunkun and forever lost amidst the big black sea surrounded by the waves.</b

45  ---

46  [[Continue|Gruta]]

47  (set: $sereiasNo to true)

48

49  :: No Bards3 (Feedback)
```

```
50  <b>They are now busy.</b>

51  ---

52  [[Continue|Taverna]]

53

54  :: No Pescador3 (Feedback)

55  <b>They are now busy.</b>

56  ---

57  [[Continue|Taverna]]

58

59  :: No Succubus2 (Feedback)

60  <b>The path is blocked.</b>

61  ---

62  [[Continue|Caminho Montanha]]

63

64  :: No Sereias2 (Feedback)

65  <b>The Aglaia is now sunkun and forever lost amidst the big black sea surrounded by the waves.

66  ---

67  [[Continue|Gruta]]

68

69  :: Sereias Mortas2 (Feedback)

70  <b>The Aglaia is now sunkun and forever lost amidst the big black sea surrounded by the waves.

71  ---

72  [[Continue|Gruta]]
```

B

Questionnaires

Use this link to access all questionnaires used the evaluation procedure of my project:

"Storytelling in Video Games" - Pilot Evaluation Questionnaire

"Storytelling in Video Games" - Final Evaluation Questionnaire Version 1

"Storytelling in Video Games" - Final Evaluation Questionnaire Version 2

Storytelling in Video Games

Hello!

We kindly ask for your participation in a study about a short video game I am currently developing for my Master Thesis on Games at Instituto Superior Técnico. Your answers will help me improve the game in the near future, so please answer thoughtfully and honestly.

We will start by asking you a few (5) questions about your perspective on games, then give you a short interactive fiction to play, 'The Ballad Of The Wizard and Sacrifice', and finally ask your opinion on the game through a short questionnaire (6 questions). The full experiment should take anywhere between 20 to 30 minutes.

All information gathered during play and through the questionnaires will be used exclusively for this project. Your data will not be shared. Any question, feel free to contact me via e-mail: susana.gamito96@gmail.com

So, buckle up for the best adventure of your life!
Susana.

Next

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Figure B.1: First page of ALL questionnaires.

Figure B.2: Second page of ALL questionnaires.

Figure B.3: Third page of Pilot Evaluation Questionnaire.

Please indicate how much do you relate with the following items after playing the game: *

	0 (not at all)	1 (slightly)	2 (moderately)	3 (fairly)	4 (extremely)
The events that were beyond my control are the cause of what happened to me	○	○	○	○	○
I am satisfied about what happened to me	○	○	○	○	○
I should have made different choices	○	○	○	○	○
I am sorry about what happened to me	○	○	○	○	○
I feel responsible for what happened to me	○	○	○	○	○
I wish the events that were beyond my control had happened diferently	○	○	○	○	○

Things would have gone better if: *

○ I had chosen differently

○ The course of events had been different.

Which decision do you want to try again the most and why? *

Your answer

Play it again if you want to!
Now, if you want you can return to the game play it again. If you don't feel like it or/and you are done you can come back and go to the next section.

Have fun!

Back   Next

Storytelling in Video Games
* Required

Play the Game

Now, for the best part, I introduce you 'The Ballad Of The Wizard and Sacrifice', a short interactive fiction which I am currently working on. All you need to play is to click on the link below and it will take you to the game.

For those who do not know, an interactive fiction is a text-based game where the narrative is told through text. In this particular case, you can progress through the game by clicking on the actions you select to perform.

One playthrough should take about 10 minutes to finish, but feel free to play it as many times as you want. After the first playthrough you can return to this questionnaire to answer the remaining questions.

One important thing that I ask you to do is to use the same ID you are using in this questionnaire when starting the game.

'The Ballad Of The Wizard and Sacrifice' link:
http://web.tecnico.ulisboa.pt/ist193968/TheBalladOfTheWizardAndSacrifice.html

ID number *

Your answer

Figure B.4: Third page of Final Evaluation Questionnaire - Version 1.

Please indicate how much do you relate with the following items after playing the game: *

	0 (not at all)	1 (slightly)	2 (moderately)	3 (fairly)	4 (extremely)
The events that were beyond my control are the cause of what happened to me	○	○	○	○	○
I am satisfied about what happened to me	○	○	○	○	○
I should have made different choices	○	○	○	○	○
I am sorry about what happened to me	○	○	○	○	○
I feel responsible for what happened to me	○	○	○	○	○
I wish the events that were beyond my control had happened diferently	○	○	○	○	○

Things would have gone better if: *

○ I had chosen differently

○ The course of events had been different.

Which decision do you want to try again the most and why? *

Your answer

Play it again if you want to!

Now, if you want you can return to the game play it again. If you don't feel like it or/and you are done you can come back and go to the next section.

Have fun!

Back   Next

Storytelling in Video Games

* Required

Play the Game

Now, for the best part, I introduce you 'The Ballad Of The Wizard and Sacrifice', a short interactive fiction which I am currently working on. All you need to play is to click on the link below and it will take you to the game.

For those who do not know, an interactive fiction is a text-based game where the narrative is told through text. In this particular case, you can progress through the game by clicking on the actions you select to perform.

One playthrough should take about 10 minutes to finish, but feel free to play it as many times as you want. After the first playthrough you can return to this questionnaire to answer the remaining questions.

One important thing that I ask you to do is to use the same ID you are using in this questionnaire when starting the game.

'The Ballad Of The Wizard and Sacrifice' link:
http://web.tecnico.ulisboa.pt/ist193968/TheBalladOfTheWizardAndSacrifice.html

ID number *

Your answer

Figure B.5: Third page of Final Evaluation Questionnaire - Version 2.

Storytelling in Video Games

* Required

About your Experience

Now that you have (hopefully) completed the game, I will ask you to answer thoughtfully and honestly to a few questions about your play experience.

Please indicate how you felt while playing the game for each of the items: *

	0 (not at all)	1 (slightly)	2 (moderately)	3 (fairly)	4 (extremely)
I was interested in the game's story	○	○	○	○	○
I felt successful	○	○	○	○	○
I felt bored	○	○	○	○	○
I found it impressive	○	○	○	○	○
I forgot everything around me	○	○	○	○	○
I felt frustrated	○	○	○	○	○
I found it tiresome	○	○	○	○	○
I felt irritable	○	○	○	○	○
I felt skilful	○	○	○	○	○
I felt completely absorbed	○	○	○	○	○
I felt content	○	○	○	○	○
I felt challenged	○	○	○	○	○
I had to put a lot of effort into it	○	○	○	○	○
I felt good	○	○	○	○	○

How many times did you play through the game? *

○ None, I did not finish the game

○ Once

○ Twice

○ Thrice or more

Regarding your experience, what would you consider the most adequate statement? *

○ I did not finish the game because of the time it took to play

○ I did not finish the game because the experience was not interesting enough for me

○ I played once and was satisfied enough by the experience to stop playing

○ I played once but would have played more if I had the time available

○ I played though the game multiple times

○ Other: _____

If you played multiple times, what motivated you the most to do so? *

○ I was having fun

○ I wanted to find out all the other possible endings

○ I didn't like the choices I had made

○ To help out in this study

○ I didn't play the game multiple times

○ Other: _____

If you played the game multiple times, what techniques did you use to go back? (check all the boxes you relate to) *

☐ Restarting the game form the beginning before ending the game

☐ Restarting the game from chapter 1 after finishing a playthrough

☐ Jumping directly to chapter 2 or chapter 3 when starting after finishing a playthrough

☐ I didn't replay the game

Figure B.6: Fourth page of Pilot Evaluation Questionnaire - I.

Please indicate how much do you relate with the following items after playing the game: *

	0 (not at all)	1 (slightly)	2 (moderately)	3 (fairly)	4 (extremely)
I felt I had a lot of choices	○	○	○	○	○
The game did not give me many choices	○	○	○	○	○
I covered all the possible decisions	○	○	○	○	○
I did not explore all possible decisions	○	○	○	○	○
I felt my choices did not matter	○	○	○	○	○
I felt that I was moving the story forward	○	○	○	○	○
I felt that my choices had consequences	○	○	○	○	○
I felt that my inactions had consequences	○	○	○	○	○
I am sorry about what happened to me	○	○	○	○	○
I should have made different choices	○	○	○	○	○
I wish the events that were beyond my control had happened diferently	○	○	○	○	○
I feel responsible for what happened to me	○	○	○	○	○
The events that were beyond my control are the cause of what happened to me	○	○	○	○	○
I am satisfied about what happened to me	○	○	○	○	○

Things would have gone better if: *

○ I had chosen differently

○ The course of events had been different.

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Figure B.7: Fourth page of Pilot Evaluation Questionnaire - II.

Storytelling in Video Games

* Required

About your Experience

Now that you have (hopefully) completed the game, I will ask you to answer thoughtfully and honestly to a few questions about your play experience.

Please indicate how you felt while playing the game for each of the items: *

	0 (not at all)	1 (slightly)	2 (moderately)	3 (fairly)	4 (extremely)
The game did not give me many choices	○	○	○	○	○
I felt good	○	○	○	○	○
I found it impressive	○	○	○	○	○
I had to put a lot of effort into it	○	○	○	○	○
I felt irritable	○	○	○	○	○
I felt that my choices had consequences	○	○	○	○	○
I did not explore all possible decisions	○	○	○	○	○
I felt challenged	○	○	○	○	○
I felt that my inactions had consequences	○	○	○	○	○
I felt completely absorbed	○	○	○	○	○
I felt bored	○	○	○	○	○
I felt I had a lot of choices	○	○	○	○	○
I was interested in the game's story	○	○	○	○	○

I felt that I was moving the story forward	○	○	○	○	○
I felt content	○	○	○	○	○
I forgot everything around me	○	○	○	○	○
I felt skilful	○	○	○	○	○
I felt successful	○	○	○	○	○
I covered all the possible decisions	○	○	○	○	○
I found it tiresome	○	○	○	○	○
I felt my choices did not matter	○	○	○	○	○
I felt frustrated	○	○	○	○	○

How many times did you play through the game? *

○ None, I did not finish the game

○ Once

○ Twice

○ Thrice or more

Regarding your experience, what would you consider the most adequate statement? *

○ I did not finish the game because of the time it took to play

○ I did not finish the game because the experience was not interesting enough for me

○ I played once and was satisfied enough by the experience to stop playing

○ I played once but would have played more if I had the time available

○ I played though the game multiple times

○ Other: _____

Figure B.8: Fourth page of both Final Evaluation Questionnaires - I.

If you played multiple times, what motivated you the most to do so? *

○ I was having fun

○ I wanted to find out all the other possible endings

○ I didn't like the choices I had made

○ To help out in this study

○ I didn't play the game multiple times

○ Other: _____

If you played the game multiple times, what techniques did you use to go back? (check all the boxes you relate to) *

☐ Restarting the game form the beginning before ending the game

☐ Restarting the game from chapter 1 after finishing a playthrough

☐ Jumping directly to chapter 2 or chapter 3 when starting after finishing a playthrough

☐ I didn't replay the game

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Figure B.9: Fourth page of both Final Evaluation Questionnaires - II.

Figure B.10: Fifth and last page of Pilot Evaluation Questionnaire.

Figure B.11: Fifth and last page of both Final Evaluation Questionnaires.