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

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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.

1. Introduction

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.

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?**

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 inactions by suggesting they could have taken a different path add replay value?** I developed a short story-oriented game where 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 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.

2. Choices, Consequences and Storytelling

In this section, I will be introducing and discussing some concepts that helped me understand my problem and bring my project to life.

2.1. The Importance of Storytelling

Storytelling is a key factor to make a game memorable. It gives purpose for the players to start the

Figure 1: Zork (1977) is especially rich game, in terms of both the quality of the storytelling and the sophistication of its text parser.

game and gets them going to finish the it while having an amazing experience. It is difficult for the players to continue the game when the gameplay is prioritized leaving the storyline disregarded. 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*[1] and *Telltale Games*[2] 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.

Life Is Strange[3] 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.

2.2. Interactive Storytelling Systems

Interactive storytelling systems tell a story while allowing the players to make changes to the world around them. It is a form of digital entertainment in which the storyline is not predetermined. The field of study surrounding interactive storytelling encompasses many different fields. Next I will be listing some systems for interactive storytelling in video games.

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*[4] and the rest of *Infocom's* canon, defined home-computer entertainment (Figure 1).

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. Competitions such as the annual *Interactive Fiction Competition*[5] for short works, the *Spring Thing*[6] for longer works, and the *XYZZY Awards*[7] , further helped to improve the quality and complexity of the games.

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.

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. This is a direct way of storytelling which allows to communicate emotion using very simple visual elements.

There are non-linear narratives in which the narrator has to follow through the players' choices. Example of this is *The Stanley Parable* [1]. In this game, 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 when the narrator explicitly tells them go for the other. The game is filled with this type contradictions that are served both to confuse the players and create a very interesting experience of playing the game and telling the story.

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. 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 [15]. I will be exploring more in depth the games

[1] Quantic Dream. (2010) Heavy Rain. Sony Computer Entertainment.

[2] D. Connor, K. Bruner and T. Molander. (2004) Telltale Games.

[3] Square Enix. (2015) Life Is Strange. Dontnod Entertainment.

[4] Infocom. (1977) Zork. Personal Software, Infocom and Activision.

[5] Interactive Fiction Competition Homepage, https://ifcomp.org/

[6] The Spring Thing Homepage, https://www.springthing.net/

[7] XYZZY Awards Homepage, https://xyzzyawards.org/

about consequences, on revealing to the players the effects of their actions and inactions as means to stimulate the players to replay the game.

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 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*[8] 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.

2.4. Save Scumming

Save scumming is the practice of the players saving the game during the playthrough and then reloading it until the players get exactly the outcome they want. Some players decry it while other players defend its inevitability and embrace it, there are many approaches to design video games around it.

Games with multiple endings and identifiable branching points encourage this type of behaviour. Saving before the branching points lets you go back through from where it twisted at your convenience.

2.5. 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 resorted 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 IEQ [7], the GEQ, and the PENS. IEQ aims to measure cognitive involvement, emotional involvement, real world dissociation, challenge and control [10]. GEQ measures absorption, flow, presence and immersion [19]. PENS in addition to immersion also measures competence, autonomy, relatedness and controls [11].

In addition to these questionnaires, there is a method to differentiate between the emotions of regret and disappointment, the Regret and Disappointment Scale RDS [**?**], for assessing the two emotions in decision making research. The RDS 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.

3. 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). 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[1, 3, 8]. 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 than a deliberate conscious self-directed action [13].

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 [5, 9, 16], self-regulation, well-being, and health [17, 4, 20].

Action effect The *action effect* [12] is the phenomenon that people tend to feel greater regret over negative outcomes if they are a result of action compared to inaction. 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 [2, 18].

Inaction Effect Although this previous concept shows that actions produce more regret than inactions, other researchers [21] concluded that concept was based on decisions made in isolation

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

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 [21] concluded label the *inaction effect*.

Regret According to *regret theory* [6, 14], 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 outcome 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 [21]. 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" [16].

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.

4. "The Ballad Of The Wizard and Sacrifice"

In the following sections, I will be detailing the implementation of my work.

4.1. 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. My approach to the problem is structured in five stages. Creating a narrative, implementing storytelling system with feedback for the actions and inactions, developing 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.

Narrative Approach 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. It is through dialog that the story unfolds and it is also a great way to convey consequences of their decisions. 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.

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.

Generation of Feedback Through Regret In order to compare how effective my hypothesis is, it two variants of the same narrative was developed. One with no attention given to the inactions of the players, and a second variant where feedback of those inactions was added to appeal towards the emotion of regret of the players.

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. 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.

4.2. Twine

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 possible to extend the created IF stories with variables, conditional logic, images, CSS, and JavaScript. 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.

5. Architecture

In this section I will be explaining the practical steps done for the implementation of my project.

Narrative Architecture 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. 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. There are more than one endings written in the game script, and the players' choices decide which ending they will reach.

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, then, later on, a passage prints different text based on the value of that variable. 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. There are a total of three chapters on the narrative, each one serves a purpose, two main branches and there is a total of nine endings endings, Figure 2 show this.

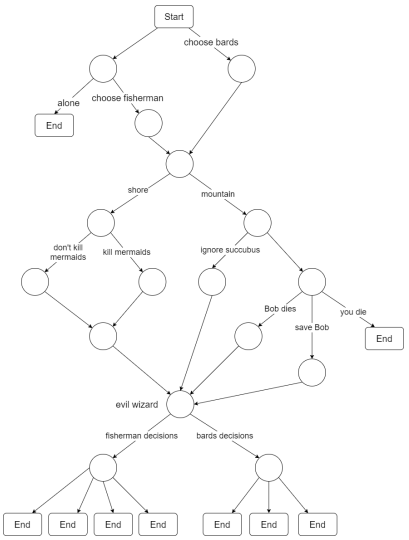

Figure 2: Narrative branch node diagram.

Feedback System Architecture Considering Figure 4, where 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 which 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), the action to take no action. Normally, for that, in a traditional approach, the story would also continue it is 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), there 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.

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. So, in order to do that, the feedback was generated with the intention of making players feel some kind of regret.

The Figure 3 shows this interaction, where the dashed line demonstrates the traditional approach and the solid line demonstrated the feedback system approach.

5.0.1 Storytelling System Architecture

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

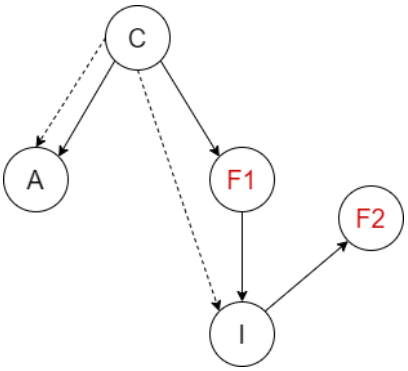

Figure 3: Feedback system diagram.

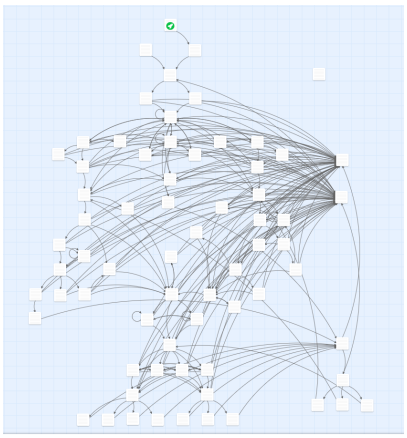

Figure 4: Final Twine story graph.

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 what links one node to the other. 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. 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.

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. 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 which chapter they would like to do so, considering their last decisions made in that playthrough are kept in the world state if they choose not to start from the beginning. 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 4.

To conclude the game, CSS, music and JavaScript were added to improve the experience.

6. Results & discussion

In this Section, I will be discussing the experimental evaluation procedure and the results from the study.

6.1. 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. This group of people was separated in half and given the different versions of the game. One version with the generation of feedback for the inactions, and the other version without, in order the compare them. The experience was identical in both versions as well as the evaluation procedure.

The evaluation is composed basically of three components, the questionnaire, the experience/game and the logging information. The procedure has the following structure: obtaining information about the players profile and their perspective on games via questionnaire; playing the game 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 the experience.

This process was conducted remotely. To each person it was given an link that would redirect them to the given questionnaire randomly. This procedure took 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, the true intentions were not revealed until the end of this experiment.

There were two stages for the evaluation procedure: the preliminary evaluation and the final evaluation.

6.2. Evaluation Materials

The Questionnaire The questionnaire is structured in the following 5 different sections: section with an overview of the project; a section for the players' profile; the section to play the experience; section to evaluate the game experience and the players emotions of regret, disappointment and their actions/inactions with items from the GEQ, the RDS and some itens I created; and a final section to thank the players for their participation.

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. To clear and group the raw log information I used RegEx and the data integration tool Pentaho[9]. Then, this information could later be joined with the data gathered from the questionnaires and processed through SPSS Statistics (Version 26)[10], a software for statistical data analysis developed by IBM.

6.3. Preliminary Evaluation

A pilot experience was conducted 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. With this, it was also possible to gather useful feedback and possible improvements for the final evaluation. The evaluation followed the same procedure explained before.

The results showed the participants had a high intensity of affective reaction. Meaning they felt a positive feeling towards the narrative/experience. 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. The experience was overall enjoyable and good enough as all player subjects played the game multiple times and passed through different narrative ramifications by making different decisions each time.

Although the results were quite satisfactory there were a few issues. Participants reported a positive emotion after playing all the playthroughs, resulting in discarding the results of the regret and disappointment indexes, one reason for this to happen might have been by the fact that theses questions were answered later after concluding all the experience and possible playthroughs of the game, meaning that the participants might have a different feeling after knowing all possibilities. To correct this I moved the questions from the RDS to after the first playthrough of each player to get their initial emotion.

6.4. Final Evaluation

The Final Evaluation was conducted with a total of 64 participants, 32 participants for each version of the narrative. The versions of the questionnaire are classified in the following way:

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

Version	$\bar{x}$	σ	$\widetilde{x}$
Affective Reaction:			
V1	2.031	1.114	2.000
V2	2.641	0.944	2.500
Disappointment Index:			
V1	1.844	0.818	2.000
V2	1.734	0.992	1.750
Regret Index:			
V1	1.953	0.846	2.000
V2	1.750	1.055	2.000

Table 1: Results of the RDS items in the Final Evaluation.

- **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;

6.4.1 Results: In General

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 ($t(62)$ = 2.361, p = 0.021, $\bar{x}(V1)$ = 1.840, $\bar{x}(V2)$ = 0.910). Where this value is notably higher for version 2 than for version 1, meaning players felt a more positive emotion towards version 2, and a more negative emotion (e.g. sadness, sorrow) towards version 1. It 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.

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. Table 1 shows that both Regret Index and Disappointment Index had the same result, concluding there were moderately some feelings of both regret and disappointment in the narrative.

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,

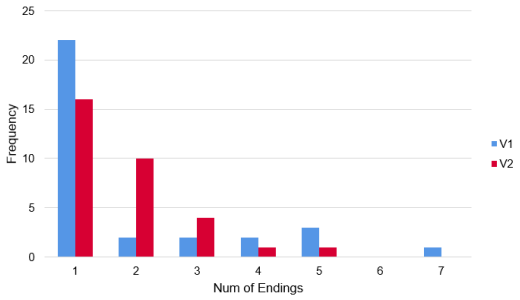

Figure 5: Distribution of the number of endings participants had.

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. Figure 5 shows this result.

Experience Regarding the experience players had towards the experience, in the general case, there was 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.

6.4.2 Results: 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 does not like it or never played it.

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 (U = 91, p = 0.022, $\bar{x}(V1)$ = 1.750, $\bar{x}(V2)$ = 0.950). 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

Version	$\bar{x}$	σ	$\widetilde{x}$
Competence:			
V1	1.719	0.975	1.500
V2	1.484	0.818	1.500
Sensory Imaginative Immersion:			
V1	2.016	0.920	2.000
V2	2.156	1.139	2.250
Flow:			
V1	1.614	0.845	1.500
V2	1.614	1.123	1.500
Tension:			
V1	0.641	0.775	0.500
V2	0.859	0.927	0.750
Challenge:			
V1	1.094	0.689	1.000
V2	0.953	0.700	1.000
Negative Affect:			
V1	0.766	0.803	0.500
V2	0.813	0.957	0.500
Positive Affect:			
V1	2.125	0.925	2.000
V2	2.234	0.933	2.000
Choice Perception:			
V1	1.953	0.995	1.750
V2	1.906	0.979	2.000
Narrative Perception:			
V1	1.422	1.264	1.000
V2	1.344	1.160	1.000
Agency:			
V1	2.813	0.716	3.000
V2	2.563	1.006	2.500
Action:			
V1	2.081	1.077	3.000
V2	2.720	1.085	3.000
Inaction:			
V1	1.880	1.314	2.000
V2	2.030	1.282	2.000

Table 2: Results of the GEQ and choice items in the Final Evaluation.

for the players to understand the branches that the narrative could take, since they enjoy this type of experience.

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 ($t(33)$ = 2.371, p = 0.024, $x(V1)$ = 2.160, $\bar{x}(V2)$ = 2.940). In addition to that, they also felt more irritable towards version 2 than in version 1 (U = 61, p = 0.029, $\bar{x}(V1)$ = 0.330, $\bar{x}(V2)$ = 0.790). 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.

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 (U = 44, p = 0.009, $\bar{x}(V1)$ = 0.920, $\bar{x}(V2)$ = 0.290). 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 ($t(27)$ = 2.705, p = 0.014, $\bar{x}(V1)$ = 3.038, $\bar{x}(V2)$ = 2.094). 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 pointed towards what could have happen differently, which can decrease 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 (U = 46, p = 0.007, $\bar{x}(V1)$ = 0.670, $\bar{x}(V2)$ = 0.170). 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 (U = 184, p = 0.056, $\bar{x}(V1)$ = 0.280, $\bar{x}(V2)$ = 0.050). Again, the feedback might have helped them change their minds, which is also in favor of the approach.

Finally, the players that played the narrative only one time, found version 2 of the game more impressive than version 1 ($t(22)$ = 2.305, p = 0.031, $\bar{x}(V1)$ = 1.210, $\bar{x}(V2)$ = 2.140). 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.

7. Conclusions

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. In order to demonstrate it, a text-based game was developed using Twine 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. To the test it, firstly a preliminary evaluation was conducted with a small group of participants and then, after some changes, the final evaluation with a larger group of participants was made.

There was one significant result taken from this experiments, the improvement of the affective reaction players felt towards the narrative. 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. It is not only about the amount of times a player plays the game, but the general feeling they have towards the narrative.

Additional 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 found 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 in 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.

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. 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 on the player. This could be done by exploring the medium in which the experiment was done.

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