Visualization of Story Completion and its Effect on Replayability

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ABSTRACT
The goal of the research as described in this paper is to investigate if visual information about the completion of a computer game’s story has an effect on the replayability of the game. The research is done through an experiment in which participants play a branching narrative hypertext fiction. The results of this research show that other aspects, like available time, the story, and curiosity because of branching, play a more important role in the decision to replay a game than visualization of the completion of a game’s story.

Keywords
Replayability, Branching, Narrative, Story, Completion, Visualization, Achievements

1. INTRODUCTION
The degree to which a game can be played again can be called the replayability of that game. Board games, for example, often have a high degree of replayability because of their requirement to be played with multiple persons. As each person acts differently throughout a play and with a variable number of participants each time a game is played, this can lead to an infinity number of plays. However, in a computer game this requirement is often not present, especially in a single player game. The replayability of a game, also known as the replay value, is very important to both the game producing companies and the players who buy the game [2]. For the game producing companies, the replay value is important to balance the value of the game’s price to its ‘value’ of gameplay. If a game has no replay value, players can lose their interest in the game more easily, which can lead to the game losing popularity and decreasing the sales of future games in the same series. On the other hand, if a game has too much replay value, users won’t have the need to buy a new game as long as their needs are satisfied by the old game. To summarize, the amount of replay value can affect the sales in both a positive and a negative way [2].

As researched by Fratessi et al. [2] multiple aspects affect the replayability of a game. Three of these techniques are visualization of story and/or game completion, branching narratives, and achievements. The following subsections explain these three techniques in further detail and the way in which they can enhance the replayability of a computer game.

1.1 Visualization of completion
The video game industries use various techniques to visualize the degree of completion of a game, which sometimes is separated into story (-line) completion and game completion. The difference between story and game completion is that story completion regards the completion of the game’s story or one of the possible storylines, while game completion regards the completion of the story and all other aspects of the game. For example, in the Grand Theft Auto series the player has to do all special jumps in the city and find all hidden items in order to complete the game for the full 100 percent.

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1http://www.rockstargames.com/sanandreas/
2http://www.lucasarts.com/games/legostarwars saga/
1.2 Branching story
A second technique that can be used by computer game developers to enhance the replayability is to use a branching story, which is a story in which different paths can be followed by the player. Thus in a branching story a storyline is forked in multiple paths on certain moments. If you would draw the paths of these storylines you would get a graph, and in this context a branching story graph as described by [5]. This is in contrast to a linear story in which a player cannot change the story in one way or another. Many game producing companies already use the technique of story branching in their games and promote this technique in the marketing campaign of their games, like Blizzard for their computer game World of Warcraft. In this game the story can already be changed before entering the game as the game’s story depends on the class and race a player chooses for its avatar [1]. Games like this focus on the story and use gameplay to tell a story, and they can be called playable stories or interactive narratives [6] as they tell a story in which the player interacts. By using a branching story, or narrative, a game producing company can make players curious for different plots or events, which players can only experience when they play the game again from the beginning. In this way using a branching story could enhance the replayability of a game.

1.3 Achievements
Finally, the addition of so called achievements is a technique that game producing companies can use to enhance the replayability of a game. Achievements, also known as badges, medals, trophies, awards or challenges, are collectibles in a game which most of the time do not have any influence on the game itself in terms of unlocking new areas or items. Achievements are locked when a player starts to play a game. When the player reaches a certain milestone, he unlocks an achievement. For example, when achievements would be used in Nintendo’s famous Mario games an achievement could be unlocked when a player completes a level within a certain time, or when he gets the larger version of Mario for the first time.

As from the launch of Microsoft’s Xbox Live network in 2005, Microsoft requires all the games for this platform to contain achievements [3]. Nowadays more online platforms contain games with achievements, like Sony’s PlayStation Network, Valve’s Steam and Microsoft’s Games for Windows Live. Players of these networks can share their unlocked achievements with their friends by creating a profile through using two different kinds of visualizations, as described above.

Achievements are often included to extend the longevity of the game. A game’s achievements could be known from the beginning, even if they are still locked. All the previous mentioned online platforms do this for their achievements, as well as they alert a player immediately when he or she unlocks an achievement. In this way a player can become curious for other achievements, which can lead to play the game multiple times to collect other achievements.

1.4 Research
The research as described in this paper is an attempt to further determine how certain techniques affect the decision to replay a game, thus if these techniques enhance replayability. In the research the three techniques which were described are used in an experiment, while one of them is altered. The technique that is altered during the experiment is the visualization of the story completion. This technique is chosen because it can be used in an unlimited number of ways. The main research question is:

- How does information about the completion of the total story affect the decision to replay an interactive branching narrative?

With the term ‘story’ all the possible storylines in the ‘total’ story are meant. This question is answered by investigating different types of visualization that could be given by game producing companies. First, there are games which do not show any completion of the story at all. Second, there are games that show a percentage, like the previous mentioned Grand Theft Auto: San Andreas. Those two kinds of visualization are compared to another type of information about the completion of the story: the fragmented overview. In a fragmented overview a player can see which parts he did experience and which he did not. This can be compared to the method in LEGO Star Wars: The Complete Saga, in which aspects of a level are checked off. To summarize, there are three different types of visualization that were used to answer the main research question: none, a fragmented progress bar (figure 2a) which can be compared to the method used in LEGO Star Wars: The Complete Saga, and a normal progress (figure 2b) which can be compared to the method used in Grand Theft Auto: San Andreas, with the difference that the percentage is visualized in a familiar progress bar.

These three kinds of information are investigated by answering the following subquestions:

- Do players replay a branching narrative if they do not receive any visual information about their completion of the story, and why (not)?
- How does the kind of visual information about the completion of the story affects the decision to replay a branching narrative game?

The first question is answered through a interactive narrative which participants play, but they won’t get any visual information about their completion of the story. Afterwards they are questioned why they did replay the story or why they did not. The second question is answered through using two different kinds of visualizations, as described above.

1.5 Outline of this paper
The structure of the paper is as follows. In section 2 the method of research is explained, containing further details on how the research was done and how the experiment for the research was set up. The results are of this experiment and the additional survey are presented in section 3. The results are further discussed in section 4. The paper ends with a final conclusion in section 5 and recommendations for future work in section 6.

2. METHOD
To answer the research questions an experiment was set up. For this experiment a hypertext fiction with a branching story was created, in which the completion of the story was visualized in three different ways: not, fragmented, or
normal as can be seen in figure 2. A hypertext fiction was used for two reasons. First, in this way the outcomes of the experiment are not influenced by the participants’ (lack of) skills in gaming. Second, it was easier to set up a hypertext fiction than a whole game in the available time.

The experiment consisted of an online website on which participants had to register themselves, to read a story at least once, and to fill in a survey afterwards. A participant was assigned to a group and depending on which group this participant was in, no or a specific kind of visualization was shown (total or fragmented, see figure 2).

2.1 Narrative

In this research a narrative was used to answer the research questions. The requirements for this narrative were that it had to have multiple storylines with different endings. The storylines had to take no longer than about ten minutes of reading. This restriction was made in an attempt to prevent people from quitting the experiment due to limited available time and to avoid the experiment would be taking too much time for the participants. The website Writing.com\(^3\) was used to find a narrative. This website contains many branching stories of which every chapter is written by a different user. At the end of each chapter there are several choices with each leading to a different sequel, which in many stories on the website has led to hundreds of chapters for some paths in the story.

It was chosen to create a narrative based on the story *A Wizard and his Dragon* \cite{4}, which is about a wizard in a war between humans and dragons who cannot determine on which side he is. The actual story is open ended and is for a few paths almost hundred chapters long, so the story has been rewritten to make it suitable for the experiment. Storylines of five chapters long were created, which led to four choices that users could make during a full storyline. With this amount of chapters was tried to tell a short story which was interesting enough to play again. The first four chapters of each storyline were written by users of Writing.com and have only been changed at certain points to make them more readable and to remove some unnecessary information, like the names of some places and people in the world which aren’t mentioned in further chapters. A different ending was written for each path to ensure the paths had a suitable conclusion - resulting in 25 endings. As shown in figure 3 most chapters are followed by two options. This number of options is chosen to limit the number of storylines. However, after the second chapter

and one chapter at the end of a certain storyline, participants could choose between three options. The reason to have three options after these chapters was to create interesting storylines.

2.2 Achievements

Every ending in the story unlocked an achievement. The names of achievements were merely based on the ending and the last option chosen. For example, in one ending the player got killed by a dragon’s flames. The achievement for this ending was therefore called *Burnt into ashes*.

Earlier choices influenced the possible achievements to unlock, because no two achievements are the same. This was done to prevent people from quitting the experiment when they receive the same achievement while reading a different storyline.

When an achievement is unlocked, this is immediately shown (figure 4). Thus with the fact that every ending unlocks an achievement, after the participant has completed a storyline the unlocked achievement is shown together with their already unlocked achievements.

2.3 Websystem

For the experiment a website was created, as can be seen in figure 5. This website ran on a database in which the chapters of the stories are stored. Furthermore, data from everyone who joined the experiment was stored in the database. This data include personal information for determining the demographics of the participants after the experiment, their choices made during the experiment, their progress during the experiment in terms of chapters read and unlocked achievements, and their survey results.

When someone joined the experiment he or she had to register by filling in their name, age, gender, education, and optionally their email address if they wanted to receive their results when the experiment was closed. When a participant was registered he or she was taken to the introduction of the story. Then the participant could continue to the first chapter and the logging of the progress in the story started. Every choice a participant made was logged in the database. When the last choice was made, an ending was presented simultaneously with an unlocked achievement (figure 4), but only when a new achievement was unlocked. Then the participant was asked to play again or to quit the story and continue to the survey. After the survey was filled in the experiment was completed.

\(^3\)http://www.writing.com
2.4 Progress bar

During the registration of a participant he was randomly put in one of three groups. As described earlier every group was shown a different type of visualization of the progress bar, as will now be explained in further detail.

The first group had no visualization of the progress bar. However the progress of a participant in group 1 was still stored in the database for analysis of the results. The second group had a fragmented progress bar showing a colored block is shown in the progress bar for each chapter read by the user (figure 2a). The third group had access to a progress bar indicating their progress in the total story (figure 2b).

In both group 2 and group 3 a participant’s progress in the whole story, or their completion in the entire ‘game’, is shown. This was done to make participants curious for other storylines, which could enhance the chance of a replay by a participant. Above the progress bar a text progress of total story was shown to make sure that participants would understand that the progress bar indicated their completion of all the storylines.

2.5 Survey

After reading the story a participant was led to a survey. The survey was used to examine why participants did or did not replay the story, and to question what they thought of the story and the experiment’s aspects. Although the survey was globally the same for every participant, a few questions depend on the participant’s group or if he had replayed the story.

The following statements had to be answered through a scale from 1 to 5 where 1 is equal to strongly disagree and 5 is equal to strongly agree.

1. I was entertained by the story.
2. It was clear there were more storylines.
3. I tried to get as many achievements as possible.
4. The achievements are a valuable addition to the game.

The following questions had to be answered through a Likert-scale from 1 to 5, where 1 is equal to much less likely and 5 is equal to much more likely. Every participant had only one of these questions, depending on which group he was in.

5. (a) If you had a progress bar indicating your progress in the story, how likely would you have been to replay the story? (group 1 only)

(b) If you had no progress bar indicating your progress in the story, how likely would you have been to replay the story? (group 2 and 3 only)

The following questions had to be answered through an open textfield. Every participant had only one of the first two questions, depending on the fact whether he or she had replayed the story or not.

6. (a) What was for you the main reason to replay the story? Please, explain. (only when replayed)

(b) What was for you the main reason to not replay the story? Please explain. (only when not replayed)

7. What is your opinion on the use of a progress bar? (group 2 and 3 only)

8. What is your opinion on the use of achievements?

9. Do you have any other feedback?

3. RESULTS

The results are divided into three parts. First the demographics of the participants will be examined. This is followed by the general results of the experiment. The section will finish with the results of the survey that is held after finishing the experiment. In the tables a small description of the each group is given for easy understanding of the table. To recall: to group 1 no progress bar was shown, to group 2 a fragmented progress bar was shown, and to group 3 a normal progress bar was shown (figure 2).
The results of question 1 are presented in table 3. Most participants gave a three or a four out of five when asked how likely they would be to replay the story if they had a progress bar. This resulted in an average result of 4.1 out of five for all participants, which is the closest to agree. The averages do not differ significantly between the groups.

2: It was clear there were more storylines.

The results of question 2 are presented in table 3. Most participants gave a five out of five for the statement that it was clear to them that there were more storylines. This resulted in an average result of 4.7 out of five for all participants, which is the closest to strongly agree. The averages do not differ significantly between the groups.

3: I tried to get as many achievements as possible.

The results of question 3 are presented in table 3. Most participants gave a two or three out of five for the statement that they tried to get as many achievements as possible. This resulted in an average result of 2.6 out of five for all participants, which is the closest to neither agree nor disagree, but lies on the side of disagree. The averages do not differ significantly when group 1 is involved, however the averages of groups 2 and 3 differ significantly.

4: The achievements are a valuable addition to the game.

The results of question 4 are presented in table 3. Most participants gave a five out of five for the statement that the achievements are a valuable addition to the game. This resulted in an average result of 3.5 out of five for all participants, which is the closest to neither agree nor disagree and agree. The averages do not differ significantly between the groups.

5a: If you had a progress bar which indicates your progress in the story, how likely would you be to replay the story?

The results of question 5a are presented in table 4. This question was only asked to the participants in group 1. Most participants gave a three or a four out of five when asked how likely they would be to replay the story if they had a progress bar. This resulted in an average result of 3.3 out of five for all participants, which is the closest to equally likely, but lies on the side of more likely.
Table 4: Questions 5a and 5b using a scale of 1 to 5, where 1 = much less likely and 5 = much more likely

<table>
<thead>
<tr>
<th>Question 5a: Replay when a progress bar would be added</th>
<th>Group 1 (No bar)</th>
<th>Group 2 (Fragm.)</th>
<th>Group 3 (Norm.)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg.</td>
<td>3.3</td>
<td>-</td>
<td>-</td>
<td>3.3</td>
</tr>
<tr>
<td>s</td>
<td>0.6</td>
<td>-</td>
<td>-</td>
<td>0.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 5b: Replay when no progress bar would be added</th>
<th>Group 1 (No bar)</th>
<th>Group 2 (Fragm.)</th>
<th>Group 3 (Norm.)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg.</td>
<td>-</td>
<td>2.4</td>
<td>2.7</td>
<td>2.6</td>
</tr>
<tr>
<td>s</td>
<td>-</td>
<td>1.0</td>
<td>0.9</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Table 5: Question 6a: Reasons for replay

<table>
<thead>
<tr>
<th>Reason</th>
<th>Group 1 (No bar)</th>
<th>Group 2 (Fragm.)</th>
<th>Group 3 (Norm.)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curiosity</td>
<td>80.0%</td>
<td>50.0%</td>
<td>50.0%</td>
<td>44.4%</td>
</tr>
<tr>
<td>Achievements</td>
<td>10.0%</td>
<td>50.0%</td>
<td>25.0%</td>
<td>22.2%</td>
</tr>
<tr>
<td>Story</td>
<td>60.0%</td>
<td>0.0%</td>
<td>25.0%</td>
<td>22.2%</td>
</tr>
<tr>
<td>Progress bar</td>
<td>0.0%</td>
<td>0.0%</td>
<td>25.0%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Unsatisfied</td>
<td>10.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>5.6%</td>
</tr>
</tbody>
</table>

Table 6: Question 6b: Reasons for no replay

<table>
<thead>
<tr>
<th>Reason</th>
<th>Group 1 (No bar)</th>
<th>Group 2 (Fragm.)</th>
<th>Group 3 (Norm.)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of time</td>
<td>30.0%</td>
<td>40.0%</td>
<td>40.0%</td>
<td>31.8%</td>
</tr>
<tr>
<td>Story</td>
<td>20.0%</td>
<td>40.0%</td>
<td>40.0%</td>
<td>27.3%</td>
</tr>
<tr>
<td>Already satisfied</td>
<td>10.0%</td>
<td>20.0%</td>
<td>20.0%</td>
<td>13.6%</td>
</tr>
<tr>
<td>Lay-out</td>
<td>10.0%</td>
<td>0.0%</td>
<td>20.0%</td>
<td>9.1%</td>
</tr>
<tr>
<td>No reason</td>
<td>20.0%</td>
<td>20.0%</td>
<td>0.0%</td>
<td>13.6%</td>
</tr>
</tbody>
</table>

Table 7: Question 7: Progress bar

<table>
<thead>
<tr>
<th>Opinion</th>
<th>Group 2 (Fragm.)</th>
<th>Group 3 (Normal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount</td>
<td>Opin</td>
<td>Amount</td>
</tr>
<tr>
<td>Unnecessary</td>
<td>25.0%</td>
<td>Unnecessary</td>
</tr>
<tr>
<td>Unclear</td>
<td>25.0%</td>
<td>Clear</td>
</tr>
<tr>
<td>Useful</td>
<td>25.0%</td>
<td>Clear</td>
</tr>
<tr>
<td>Gaps noticed</td>
<td>12.5%</td>
<td></td>
</tr>
<tr>
<td>Unnoticed</td>
<td>12.5%</td>
<td></td>
</tr>
</tbody>
</table>

5b: If you had no progress bar which indicates my progress in the story, how likely would you be to replay the story?

The results of question 5a are presented in table 4. This question was only asked to the participants in group 2 and 3. Most participants gave a three out of five when asked how likely they would be to replay the story if they had no progress bar. This resulted in an average result of 2.6 out of five for all participants, which is the closest to equally likely, but lies on the side of less likely. The averages do not differ significantly between the groups.

6a: What was for you the main reason to replay the story? Please explain.

In total 39.4% of the participants replayed the story at least one time. The main reasons to replay the story that they gave can be divided into five aspects, which can be found in table 5. Some participants named two reasons to replay the game. The curiosity to what other options would do was mentioned the most times. Closely related is the reason to replay the game because of the story, because it was interesting or entertaining. Of the participants who named the achievements as their main reason, 75.0% succeeded in getting at least twenty achievements. These participants also played the story at least thirty times.

6b: What was for you the main reason to not replay the story? Please explain.

In total 60.6% of the participants did not replay the story. The main reasons to replay the story that they gave can be divided into five aspects, which can be found in table 6. Some participants named two reasons to replay the game. The reasons that were mentioned the most were lack of time to do another storyline, lack of interest for these kind of stories (fantasy), or that the story was too short. Other participants were already satisfied after playing one storyline, and said that they always act this way when playing such a game. The aspect lay-out contains reasons in which a lack of images was mentioned or in which people said that they do not like reading from a computer screen.

7: What is your opinion on the use of a progress bar?

This question was only asked to the participants in group 2 and 3. The opinions of the participants in group 2 are divided on the use of the progress bar, as can be seen in table 7. The progress bar was found unclear or was not noticed by 37.5% of the participants. A quarter of the participants found the progress bar useful, while the same percentage thought it was unnecessary. The holes in the fragmented bar were noticed by 12.5% of the participants, but a further detailed opinion on the progress bar and the gaps in it was not given.

In table 7 can be seen that in group 3 the most participants liked the progress bar. They liked to know how much time or story they had left until the end. The main reasons for the participants who found the progress bar unnecessary were that they did not want to know how much of the story is left.

8: What is your opinion on the use of achievements?

The results of question 8 are presented in table 8. Some participants mentioned more than one opinion. The most mentioned opinion on the use of achievements is that achievements are fun. In groups 2 and 3 some participants found the achievements and their use unclear, while some participants in group 1 mentioned that achievements could motivate the player in a positive way. In group 2 there were some participants who missed the added value of achievements, while this was less often mentioned in groups 1 and 3.

9: Do you have any other feedback?

Answers to questions 9 of the survey contain some ideas for improvements. Three participants suggested the use of illustrations besides the text, or that the story would be nice as a comic. Another participant mentioned that if he had more days available instead of ten minutes he would be more likely to replay the game. A last suggestion was to increase the length of the story, which was found too short by one participant.
Table 8: Question 8: Achievements

<table>
<thead>
<tr>
<th>Achievements</th>
<th>Group 1 (No bar)</th>
<th>Group 2 (Fragm.)</th>
<th>Group 3 (Norm.)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>are fun</td>
<td>30.0%</td>
<td>27.3%</td>
<td>30.8%</td>
<td>29.5%</td>
</tr>
<tr>
<td>are unclear</td>
<td>10.0%</td>
<td>27.3%</td>
<td>23.1%</td>
<td>18.2%</td>
</tr>
<tr>
<td>are positive motivation</td>
<td>30.0%</td>
<td>9.1%</td>
<td>7.7%</td>
<td>18.2%</td>
</tr>
<tr>
<td>lack added value</td>
<td>5.0%</td>
<td>27.3%</td>
<td>15.4%</td>
<td>13.6%</td>
</tr>
<tr>
<td>contain added value</td>
<td>5.0%</td>
<td>9.1%</td>
<td>15.4%</td>
<td>9.1%</td>
</tr>
<tr>
<td>act as goal</td>
<td>10.0%</td>
<td>0.0%</td>
<td>7.7%</td>
<td>6.8%</td>
</tr>
<tr>
<td>create negative pressure</td>
<td>5.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>2.3%</td>
</tr>
<tr>
<td>(no comment)</td>
<td>5.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>2.3%</td>
</tr>
</tbody>
</table>

4. DISCUSSION

Looking at the results of question 1 it can be concluded that the story entertained the participants. Although the story entertained the participants, it seems that it did not entertain them enough to replay the game. That can be concluded from the fact that more than a quarter of the participants who did not replay the game mentioned the story as one of their main reasons, as found in the results of question 6b.

The results of question 2 show that the participants strongly agree that it was made clear that there were multiple storylines. There were several aspects which indicated that the story had multiple storylines, but due to the lack of possibility to explain a given answer in the survey it cannot be said which aspect helped the most to hint for more storylines, although the use of different options at the end of each chapter would probably the main reason when the participants would be asked to explain their given answer.

The results of question 3 significantly differ for groups 2 and 3. This is remarkable when compared to the results of question 8, in which the participants’ opinion on the use of achievements was asked. While participants of group 2 neither agreed nor disagreed with the statement that they tried to collect as many achievements as possible, they did not see the achievements as goals to reach and they were not as positive about the achievements as the participants of group 3. Probably the significantly is a coincidence due to the small number of participants per group. Both groups do not differ significantly with group 1, which is close to the total average.

According to the results of question 4 the participants are not outspoken about the question whether achievements are an added value to the game or not. These results correspond to the results of question 8, which was about the use of achievements. Those results show that roughly half of the opinions are positive about the achievements and thus the other half negative. It can be concluded from the results of questions 4 and 8 that the opinions about achievements are divided.

Looking at the results of questions 5a and 5b it seems that whether a progress bar is added or removed, the participants do not think their decision to replay would differ much. It is a little more likely that a participant would replay the story when a progress bar would be shown, and it is a little more unlikely that a participant would replay the story more often when the progress bar would be removed, but in both cases there is no clear answer. These results do not contradict the results of questions of 6a and 6b, where the progress bar seems to be a reason to replay the game for a number of participants, and where the lack of a progress bar is not mentioned at all as a reason to not replay the game. The lack of time and the lack of personal interest in the kind of story seems to be much more important aspects to the decision of replaying a game. Although curiosity is an important reason to replay a game, this was not created by the progress bar alone as it is the most mentioned reason in group 1.

According to the results of question 7 the progress bar was found unnecessary. This also does not contradict with the results of the questions 5a, 5b, 6a, and 6b. More remarkable are the differences between the opinions to the clearness of the progress bar. It seems that a normal progress bar with a percentage is clear, probably because of the familiarity participants have with this kind of bars. The fragmented bar was found useful for completing the story. However, for both progress bars it can not be concluded that the progress bar was interpreted in the right way.

The results of question 8 show that group 1 seems to be satisfied more with the achievements than groups 2 and 3. An explanation for this could be that the use of a progress bar and achievements together gives a participant too much replay value, which could be working counteractive, and thus decreasing the need to replay.

5. CONCLUSION

To answer the main research question the subquestions should be answered first.

Do players replay a branching narrative if they do not receive any visual information about their completion of the story, and why (not)?

It seems that players do replay a branching narrative game, even without receiving any visual information about their completion of the story. Curiosity because of branching and achievements seem to be the most important factors which could enhance the replayability, where lack of time reduces the replayability. Also the story is an important factor in the decision to replay, but it highly depends on the player’s preferences. It therefore can either enhance or reduce the replayability.

How does the kind of visual information about the completion of the story affects the decision to replay a branching narrative game?

This research could not provide an clear answer to this question. It seems that visual information does not play an important role in the decision to replay, but the differences between the groups which use a kind of visual information about the completion of the story, are too insignificant.

How does information about the completion of the total story affect the decision to replay an interactive branching narrative?

According to this research there seem to be more important aspects which play a role in the decision to replay an interactive branching narrative than information about
the completion of the story. Those aspects include the
game’s story, the available time, and the fact the game
uses a branching story in which it is clear choices can lead
to different storylines. Achievements could also work, but
according to the given opinions on the use of achievements
they should contain added value, for example unlocking
areas or items. The way in which achievements were used
during the experiment are only an addition to the game
for players who are already familiar with achievements and
like collecting them.

6. FUTURE WORK
For further research it is recommended to have larger groups
to prevent significant differences between the groups that
are hard to explain. When a larger number of participants
is used in an experiment for further research it is suggested
to use two different types of narratives and let the partic-
ipants choose which one they want to play, for example
fantasy or science fiction. By doing this the experiment is
closer to the reality in which people often choose a game
close to their personal preferences. In that case the two
stories should be comparable with each other.

Another possibility for bringing the experiment closer to
reality is to give the opportunity to continue with the story
or game a few days later. In every computer game you
can save your progress to continue at another time, which
makes it more attractive to replay some days later instead
of directly after you completed a storyline.

Further research can be done on the use of achievements.
In the research as described in this paper there was no
clear opinion on the use of achievements and participants
did not always understand their presence.

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