

I See, Please Tell Me More – Exploring Virtual Agents as Interactive Storytellers

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Abstract. This study explored the effect of a virtual agent, used as a storyteller in an interactive story, with the purpose of distributing information to leaders at the municipal government of Esbjerg, Denmark. The aim was to investigate the influence an agent might have on the user experience, when comparing it to a story with no agent. A simple story was implemented where the user could choose which parts to read. A test was held where ten participants went through the story with and without an agent as a storyteller, and took part in a focus group discussion. Data on story choices and time was saved and analysed along with the focus group data. From the overall findings it can be concluded that a storyteller agent has a positive impact on the experience. Furthermore, that interactive storytelling requires care in placement of important information, so as to avoid it being missed.

Keywords: Storytelling, Agent, Information distribution, User experience, Leadership.

1 Introduction

“Storytelling taps into one of the oldest pastimes, a way of uniting communities, conveying truths and entertaining those we love. Children beg to be told a bedtime story, and so, a small part of us continues to feel comforted and reassured by information presented in the form of a tale” [1].

Storytelling has increasingly been used as a leadership and information distribution tool. “Leadership involves inspiring people to act in unfamiliar and often unwelcome ways. Mind-numbing cascades of numbers or daze inducing PowerPoint slides won’t achieve this goal. Even logical arguments for making the changes usually won’t do the trick. But effective storytelling often does” [2]. A common element of storytelling is the storyteller herself. “The storyteller, more than other type of sender, manages to capture the attention of the hearer, keeping the energies involved in the process of telling” [3]. A virtual agent [4] is a common way of telling a story in an application. Related work [5, 6] indicates that there is a preference for having a storyteller present visually, even if he/she is unrelated to the story. Furthermore, it hinted at a possible correlation between the length of the material and the strength of the user’s desire to

have a storyteller [6]. Other research [7, 8] has indicated that nonverbal behaviour of virtual agents also influences the experience of the user. It has also been determined that an agent with different facial expressions is perceived as more credible [9]. Hertzum [10] emphasizes the importance of trust in a virtual agent for information distribution. While others [11, 12] emphasize the importance of having facial expressions matching the emotions the agent is supposed to be feeling at that moment. Elliott [13] further highlights the benefits of multi-modality in agent perception.

2 Methodology

2.1 Hypothesis and Research Questions

The hypothesis was formulated as: “A virtual agent will not influence the experience of the story, compared to a non-agent situation, when it comes to storytelling for information distribution”. Additionally, the following sub-questions were investigated:

- What impact will the virtual agent have on the experience?
- If information is presented as a dialogue tree, is there a risk of information being missed by the user?
- Are there factors that impact the design of an agent for storytelling?

2.2 Case Study

A case study approach [14] was chosen for this work, where the main focus was work environment guidelines in the municipal government of Esbjerg, Denmark (MGoE). The recipients of this information are 25-60 years of age, of both genders, and mainly working in desk jobs at city hall. Specifically the story for the application was aimed at covering a rule in the MGoE for contact with employees who are on sick leave. The rule is titled “1-5-14”, where the numbers symbolize the days on which the leader should be in contact with the employee who is ill.

The idea is that sometimes something as simple as having to change desk at an office can sometimes make people ill (MGoE, personal communication, October 2012). If the department leader is in contact with the person in question on the first day, they can work on solving the problem as soon as possible. While this may seem like a reasonable idea, it has caused controversy, where some feel that it is intrusive or patronizing for a leader to be calling an employee the first day they report in ill (MGoE, personal communication, March 2012). The story was constructed to have a morale reflecting the reason behind this rule.

2.3 Test Sample

The test sample consisted of people working in leadership roles, and two people from the health and safety organisation, at the MGoE. Time constraints meant that a sample

of ten volunteers in leadership roles at city hall was used. The group consisted of seven women and three men, working in significantly different areas, such as the communication, health, HR, payroll, and environmental departments. The range of participants was chosen to ensure more widely applicable results.

2.4 Prototype

The prototype is implemented as a series of webpages utilizing PHP scripting. At the start of the test the participant is presented with one of two storytelling methods, and after concluding that story, the participant will go through the story again using the other method. The methods have been designated “A” and “B”.

Method A utilizes a virtual agent as the storyteller. The story is presented as text, next to a picture of an agent that acts as the storyteller. The agent is animated using a simple animated gif image. The image has two states: “Talking” and “Waiting”. When the page is initially loaded, the agent will be in the “Talking” state for nine seconds, which was approximated as the average time it would take to say the dialogue. During this time, the agent will move his mouth every 0,2 seconds to simulate mouth movement while talking. After the initial nine seconds, the agent will go into the “Waiting” state, which is where he awaits the response from the user. During this state the mouth will move every four seconds, to simulate his anticipation of awaiting a response. During both stages the agent blinks every 5 seconds to simulate average human blinking [15]. He will also change his gaze every 10 seconds to simulate random movement of the eyes during speech and waiting.

The story is implemented as a series of screens on which the storyteller will reveal parts of the story and allow the user to ask from a list of predefined questions. Some of these questions move the story along, while others elaborate on the topic most recently covered. For example: One of the first screens introduced the main character and it is explained that the story is about one time when he became ill. The user can then ask either who the person is, how long it took for him to get well, or what was wrong with him. Each response will result in elaboration on the topic, and the question regarding the nature of his illness will also carry the user to the next set of questions. There is no requirement to see all the details of the story, as long as the user makes it to the end. However, in previous research [6] it was found that some young people who play games prefer to see all the bits of the story. So the purpose of including the possibility to skip parts here was to find out if the same idea applies to the leaders at the MGoE. At the end of the test, the list of choices the user made are saved, as well as the time it takes them to make each choice.

In storytelling method B, the story was structured similarly to method A. The same choices were available at the same stages, and this was logged for later analysis. The story text differed a bit due to the lack of a storyteller (i.e. the storyteller would sometimes refer to him as “I” and to the user as “you”), but they were kept as close as possible to eliminate bias. The main difference was in the visual implementation of the storytelling, where the text simply appeared on a virtual display.

2.5 Story Implementation

The story revolves around the fictional Mr Jensen who works in an office at city hall. He goes on sick leave, and his boss decides not to contact him, to give him some peace and quiet in order to recover faster. When Mr Jensen returns after a week and a half, it actually turns out that the illness was related to him getting blinded by the sun due to non-functional solar screening – something that could potentially happen at the real city hall. The problem could have been solved fast, but the boss' hesitation resulted in a prolonged stay away from the office. As a side effect, the other people in the office all had to work harder; as did Mr Jensen when he came back. The morale of the story is that not being in contact with employees on sick leave can have negative consequences and prolong the time away from the office.

2.6 Test Setup and Process

The test was conducted as part of a focus group interview [16] with all participants located in the same room. The participants were split into two groups, and one was asked to start with method A and the other with method B. One participant misunderstood and did the tests in the wrong order, resulting in a total of six people starting with method A, and four with method B.

Before the test began, the participants were given a brief introduction regarding the general purpose of the test, but the specific details were not mentioned. The participants were told to take as much time as they'd like to go through the story. At the end of this test, a researcher asking questions from a prepared structure led a 45-minute focus group discussion. The participants were allowed to talk freely, and the questions were used as a guideline to ensure that important topics were covered.

Though the participants in the two data gathering parts are the same, they are not uniquely linked. For this reason, participants in the application data are designated 1-10 while the ones in the focus group are designated A-J. Participants 1-6 and A-F experienced storytelling method A first, while the remaining four began with B.

One of the participants later revealed that she suspected the purpose actually being to test the leadership capabilities of the people present, by analysing the choices made along the way (e.g. does the participant ask about Mr Jensen first, or are they more interested in when he came back to work). It seems she didn't get this impression until after going through the story. However, she did not participate much during the focus group discussion, and this may be a result of her being unsure about the purpose of the questions.

3 Results

3.1 Application Data

As mentioned earlier, the time spent for each screen was saved, along with the path the participant took through the screens. The time can be seen in Figure 1 indicates the

number of screens not visited, in each of the storytelling methods. As the structure is the same for both methods, these numbers are comparable. This number is influenced by the design of the application, and the choice early on to experience the story in the first place. The maximum number of screens that can be missed is ten (seventeen if they say no to the story). They also have to miss at least two screens if they accept the story, since those are associated with saying no.

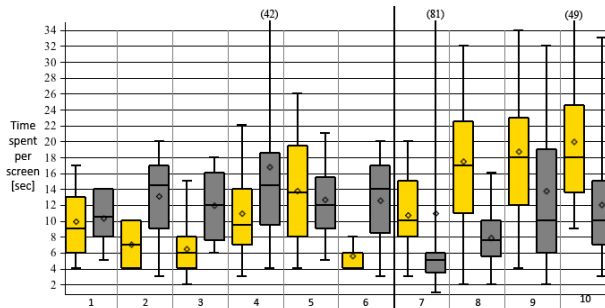


Fig. 1. Time spent per screen. The boxes represent the median, 25th and 75th percentile, average (dot), and outliers (whiskers). For each of the ten participants the left box represents the time spent with method A, and the right box method B.

3.2 Focus Group Interview

The issue the focus group felt strongest about was the fact that the storyteller doesn't speak. The text was meant to appear as a speech bubble, the story is often written in the first person, and the agent moves his mouth as if he is speaking, but there is no audio. This was articulated the firmest by participant B who directly said "I didn't focus on the animation at all, because I didn't have any sound, so I didn't even look at it". When later asked what one thing they would change if they had the option, everyone once again agreed on adding sound. Participant C said, "it would be nice to hear what his voice is like". Several participants mentioned the ability to relax when you have a story read aloud to you, which they felt is different from reading it yourself. One participant brought up the issue of voice, mentioning that people have different preferences. Several participants agreed, and suggested that maybe it would be good to be able to choose from several different voices, perhaps even celebrity voices. A counterpoint was brought up by participant E who said, "if you are sitting in an open office environment, all the storytellers will be talking over each other", to which other participants made motions as if putting headphones on.

When asked about the identity of the storyteller, it was discussed whether the agent should be fictional. The group was presented with the idea that the storyteller could be an animated version of a real leader working at city hall - perhaps the sender of the information. The group laughed out loud at the prospect of seeing one of their colleagues in animated form, and participant I stated that "it would seem disingenuous

if it was a real leader standing there moving his mouth [as seen in Monty Python animations]”. Participant H added that if the agent were an animated version of a real person, you would focus too much on him and forget about the story.

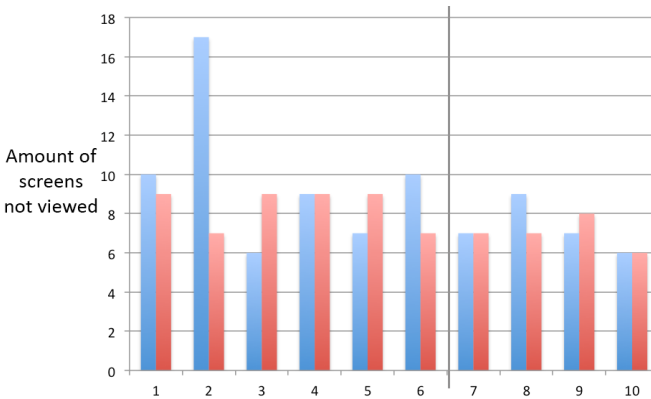


Fig. 2. Screens not viewed for each of the ten participants. The left column represents method A, the right method B.

Several others agreed that it does not matter if the agent is real, since the story is the main focus. This was later clarified by Participant I who stated, “he should look like a leader” when she found out that he was originally designed for another project in which he was a criminal. Participant J mentioned that he became more interested in the application due to the reaction of participant I, who was sitting next to him. During the test, she let out an “ohh” when she saw the storyteller the first time. Participant I said that the exclamation came because she thought the agent looked fun and interesting. Several participants voiced ideas about having a choice of storyteller appearance, or even having the same story told from multiple viewpoints (e.g. the leader, Mr Jensen, or a third person).

A topic of some debate in the focus group was the difference between having the virtual agent as a storyteller (method A), and simply seeing the story as pure text (method B). As mentioned earlier, the stories are structured in the same way in both methods. However, the general consensus of the participants was that method B was more structured and participant A even felt that “it was confusing to choose questions [opposed to topics in method B]”. Only participant B said that there was no difference in structure between the two. He did, however, feel that method A was better at leading him to where he wanted to go, and that method B had him running in circles.

Despite the perceived structure of method B, most participants felt that method A was better overall. Participant E said that she normally likes to read things systematically, but in the case of method A she felt more captured by the fact that there was a storyteller. She also felt interested by the fact that the storyteller actually led her to a good reason for working with the “1-5-14” rule. She felt that this topic in particular is good for use with an animation, as it is something that everybody from employees to top management needs to understand if it is to become a success, and an animation

can help with that. Several other participants agreed with this. Participant D elaborated “as humans we learn in different ways – by reading, seeing, listening. [...] The way we currently communicate online is by demanding that people read. Many read but don’t actually understand, and an animation like this will make sure that some people will understand 100% what the issues are.” Participant C added that there have been cases where even a manager of a company doesn’t understand what he is reading. Participant A stated that due to the volume of information available on the internal network, some people will not see certain pieces of information unless it is necessary, and in those cases the animation may be exactly the motivation they need. Several other participants agreed.

Participant C said that she felt the question format [opposed to simply topics in method B] were better for covering what the point of the story was, to which participant B added that the questions make the information stick better. The only negative feedback on the questions was in regards to the fact that the same options appear multiple times, to allow for the user to re-read parts previously visited. Several participants stated that they were confused or annoyed by this, and one even said he thought he had made the wrong choice since it was being asked again. He also mentioned that he saw it more as a way to improve leadership abilities by determining which you care about the most; the person, the illness, etc. Because of that, he would have liked for the system to be able to show the “correct” way to go through the story at the end.

Several participants also mentioned that they see this more as a tool for employees than for leaders. Perhaps as a replacement for seminars, where people usually like to hear a good story being told by the presenter. Instead they could experience these stories through the computer. However, other participants cautioned against too much use of this kind of system, as they believe the novelty would then wear off, and reduce the motivation to go through the stories. One participant said that if he was made to sit and listen to stories for a prolonged period (e.g. as part of an introduction) he would fall asleep after 15 minutes. The focus group all agreed that the virtual agent should be an option, and the alternative should not be storytelling without a virtual agent, but rather simply a clear list of requirements (as information is presented today). Interest should then dictate when a person decides to also experience the story.

4 Discussion

The times spent on each screen (Figure 1) show what one could expect: The participants spend less time on the storytelling method they experience as number two. This could be attributed to the fact that the story is the same in both methods. Only participant 5 is unique, in that he/she spent slightly longer (median of 1 second more) on the agent, despite experiencing him the second time through the story. For more accurate data, this part of the test should be repeated with different (but comparable) stories, so all participants experience a story for the first time with one of the methods.

However, it shows that the agent was not interesting enough to motivate the participants to spend significantly more time with him. This was somewhat echoed by some participants in the focus group, who were more interested in speaking about the

implications of using storytelling for information distribution, than what the impact of the agent was.

An interesting factor in the time spent on screens is the difference between the storytelling methods for the individual. Those that started with method A spent an average of 7,8 seconds less on method B, while those that started with method B only spent an average of 5,2 seconds less on A. This could be an indication that the agent does add something, which makes people spend slightly more time, but the sample is too small to rule out coincidence [17].

The number of screens missed, does not seem to relate to the storytelling method. Rather, it was mostly around 30-50% of the available screens. In the focus group interview the participants were asked if they felt a need to visit all screens to get every bit of the story, and everybody disagreed. The predominant opinion was that it was up to the user to choose his way through the story, or choose the order in which he wanted to experience the different parts. This was the opposite of previous findings [6], which showed that gamers wanted to explore every part of a story, though these are not comparable due to the vastly different target group. It emphasizes the importance of using this as a secondary information distribution tool, in addition to the way in which information is currently distributed. This was brought up several times by the focus group, who made it clear that if they had the choice they would first go for a simple list of requirements and only use the story if they wanted additional information or couldn't understand the reasoning behind the requirements. If the story is to function as a primary source of information, the mandatory pieces of information could be placed in parts of the story that cannot be missed. In the case of this test, it was impossible to skip several screens (except by saying no to the story in the first place), so the information on these screens would be seen. The optional screens could then be used for information which is "nice to know" but not mandatory.

This would also fit with the focus group's thoughts about using it primarily as a tool for employees rather than leaders. It was a general feeling that this kind of storytelling is best used in smaller portions to keep it feeling special and not boring the users. The visual design of the agent only held a little importance for the focus group, who focused more on the general look. For example, wanting to be able to choose the look and not wanting him to look like a real person. The mentioned desire to have the agent look like a leader is in line with Hertzum [10]. The addition most wanted seemed to be speech from the agent. It was not implemented in the test application to keep the focus on the presence of the agent, but this seems to have been a mistake as it was found that many wanted it. The reasons ranged from making him more interesting, to being able to relax or learn better by listening instead of reading. Many games use agents as storytellers without speech, but as the target group in this project was not selected to be gamers, it is not surprising that they have different expectations. Related work with agents as storytellers [13, 18] also included speech with beneficial results.

Despite the facial expressions being displayed with no connection to the emotional content of the story, the adverse effects reported by others [11, 12] did not occur. This may be a result of the agent not having an emotional stake in the story, and thus the negative effects were not noticeable. The group brought up additional possibilities for

using the agent as a mentor for new employees, or an instructor in a tutorial to avoid work-related injuries.

5 Conclusion

The overall hypothesis “A virtual agent will not influence the experience of the story, compared to a non-agent situation, when it comes to storytelling for information distribution”, was disproven. While no link could be made between the agent and the time spent on each storytelling method, it was clear from the focus group that the agent was perceived positively. He was seen as an interesting addition that had a positive impact on the story and the information contained within. This is in line with previously mentioned related work [5, 6]. When comparing the storytelling to the current means used to distribute information, the focus group was all but ignoring method B that doesn’t have the agent. If information is presented as a dialogue tree, there is a definite risk the user will miss parts of the information. This was clear from the data gathered during the test, which shows that nobody saw all parts of the story about Mr Jensen, and many missed almost half of the details. If information is presented in this manner, it is necessary to ensure that the important details are unskippable.

The factor impacting the agent the most in the test conducted for this work was the lack of audio, which the focus group highlighted several times. Overall they did not have any firm opinions on the visual look of the agent, but they did voice concerns that the content would not be taken seriously or paid as much attention to, if the agent was made to resemble a real leader from city hall.

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