

“I Want to Slay That Dragon!” - Influencing Choice in Interactive Storytelling

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Abstract. In this paper we consider the issues involved in influencing a user in an interactive storytelling context using results from the social psychology’s area of persuasion. We hypothesize that it is possible to use these results in order to influence the user in predictable ways. Several important concepts of persuasion, such as how people make decisions, and how can we influence that process are discussed. We describe a proposal on how to apply these results in an interactive storytelling setting and describe a small study where we have successfully influenced the players of a story in following a specific path by using an expert source manipulation.

Keywords: Interactive Storytelling, Persuasion, Interactive Narrative.

1 Introduction

The area of Interactive Storytelling has focused on methods that allow users to experience a story that they feel in control of, while still experiencing it in an author’s idealized way. To achieve this goal, most of the work focuses on dealing with user intervention, either by accommodating users’ actions into the story, when that is possible, or by disallowing or even changing the expected effect of a user’s action to guarantee that the flow of the story as imagined by the author is not disrupted.

One of the central goals for every Interactive Storytelling system is to provide the user with the feeling of *Agency*. Agency “is the satisfying power to take meaningful action and see the results of our decisions and choices” [22]. If we look carefully at this definition, we can arguably conclude that for agency to be truly experienced the user has to be given a choice. Furthermore, the user has to have the intention of pursuing a particular course of action over another. Yet, simply providing the user with the opportunity to choose amongst different options does not necessarily guarantee agency. Imagine the extreme situation where each time the user is given the opportunity to choose between different courses of action he/she always chooses randomly without giving any thought to his/her choice (e.g. because he/she does not understand it or because he/she is unmotivated to do so). In that case, even if the user’s action shapes the

development of the story, it will look random to the user since he/she did not have any expectations at the time of performing the action.

The time prior to making a particular choice is then critical for the user's feeling of Agency. It is at that time that the user forms the expectations that, if fulfilled, will result in the experiencing of agency.

Imagine now that you could build a system that could influence the user's choices in such a way that the user would not only choose the author-idealized path for the story but would also have the intention to do so. Such a system would have to provide specific stimuli to the user prior to each of his/her decisions that would have a specific impact on which cognitive content was generated by the user at that time. That specific cognitive content would have to be the one used to make the decision on how to act. Such a system would have the added benefit of providing the user with a feeling of *Agency* while having the user act in a predictable way. Furthermore, it could be enhanced with all the existing techniques used to handle unaccounted user intervention [34] [13] [19] since all those methods are employed after the user acts.

As such, we can think of a perfect scenario where a system could dynamically provide the necessary motivations to the user in order for him/her to act in accordance with the story's goals in an interactive story, and in that way mold the user's experience accordingly to the criteria encoded in the system by the author.

In the remainder of the paper will try to provide evidence that this kind of approach is possible and can be applied in the area of Interactive Storytelling.

2 Related Work

Research in interactive storytelling focuses on ways to incorporate the user as an active element of the story. This raises many technical challenges, such as the need to maintain a coherent story that conveys an author-idealized message while accommodating the user's actions, even when these do not resonate with the intended story path. This has been described as the *boundary problem* [18].

There are several approaches that have been pursued to tackle this problem. For example, in Mimesis [37] a story is the output of a planner that takes both into account the user and the characters' actions. Each time the user deviates from the plan the system tries to accommodate the user's action by creating an alternative plan that still conveys the author-intended story while incorporating the new action. If that is not possible the system intervenes by changing the incompatible effect of the action [34]. This procedure was coined as *Mediation* of user's actions.

Later, the Mediation procedure was further enhanced by actively searching where the user could break the story in order to adapt the story plan in such a way that those disruptions ceased being possible [13].

In Façade [19] the story is authored in the form of a collection of beats. A beat is an enclosure for a collection of behaviors that describe how the characters will perform throughout its duration. For each beat it is possible for an author to

specify how the characters will react to the user. Each user action is interpreted as one of several possible *discourse acts* where each represents a class of possible user actions (e.g. agree, disagree, thank, etc). Additionally to handling the discourse act in a specific beat, the author can also define a global rule to handle the discourse act in a story-wide fashion.

In FearNot! [8] the user interacts by giving advices to one of the characters. The story in FearNot! is represented through a collection of episodes, where in each the content displayed emerges [2] through the interactions between the characters. In between episodes the user can interact with one of the characters by providing advices on how to cope with previous events. The advices influence the behavior of the character which in turn will affect the development of the story.

Research developed in Mark Cavazza's group [7] allows the user to interact with the characters by manipulating resources in the story world or by using natural language to alter the characters' behaviors by proving relevant information.

All these approaches focus on coping with user action in order to incorporate it in the story world. The only exception is Mimesis' pro-active mediation [13] where possible harming paths that can be triggered by the user are disabled by reformulating the story plan.

An alternative approach which focuses on influencing the user by manipulating the perception of scarcity was shown successful in increasing the likelihood of the user following a particular path in a branching story [32].

The approach we propose here involves subtly influencing the user before he/she acts so that when reaching a point where he/she has to make a decision he/she will likely choose the one the author idealized for the story.

3 Choice, How Do We Do It?

The area of Persuasion in social psychology focuses on understanding how a message can be made in order to produce attitude change in a particular direction. It can be roughly described as the presentation of a fabricated set of stimuli that will have a predictable effect on the receiver's attitudes (attitudes usually mean general evaluations that are capable of guiding behavioral, affective and cognitive processes).

By changing the attitude of an individual towards performing a particular behavior we can increase or decrease the likelihood of the user performing that behavior [9].

If these processes could be brought to the area of interactive storytelling we would have a way to influence how the user acts in such a way that he/she would more likely comply with the systems's intended course for the story. With the added advantage that if these processes fail, we could still rely on all conventional methods for dealing with improper user action.

One important result in the area of persuasion that is directly related with how we make choices has to do with the cognitive processes elicited by the exposure to a persuasive message (e.g. written, oral, visual, etc). At first it was thought that the effectiveness of attitude change was directly related with

the retention of the content of the message [15] [21] [36]. However, this was later disproved by showing that learning does not necessarily produce attitude change (memorizing a persuasive message does not necessarily lead to attitude change in its direction) [14].

As an alternative to attitude change being related to the retention of the content of a persuasive message, it was shown that the change in the direction of the persuasive message is in all related to the cognitive responses elicited by the message. Each time a subject is exposed to a message which requires him to make a decision he/she will employ cognitive effort that will result in the generation of supportive or unsupportive thoughts regarding the position advocated in the message [11] [4]. These thoughts are determinant of the subject's final attitude and can be tested without changing the effect of the message [23].

There is a common technique used in the area of persuasion named thought-listing technique [6] [11] [23], that allows for the assessment of the effects of a persuasive message in terms of attitude change. The procedure involves exposing subjects to a persuasive message and asking them to list the thoughts that were elicited during the exposure. The thoughts are then classified as being in support of, in opposition of, or neutral towards the advocated position. If a message generates predominantly favorable thoughts it is likely to produce attitude change towards the advocated position; if it produces mostly negative thoughts it is likely to produce attitude change contrary to the advocated position.

This technique allows us to produce messages that have a predictable effect on the user, and can be made in such a way that they are employed in important decision points in the story to increase the likelihood of the user complying with the goals of the story. Although the results from social psychology are encouraging with respect to this technique [23] [11], there are other results that are complementary, and demonstrate that it is possible to enhance the effectiveness of this approach. These results will be addressed in the next section.

4 Different Cognitive Processes Involved in Decision Making

Initial research in the area of persuasion was marked with disappointment as seemingly all variables tested were shown to have contradictory effects in different studies [14] [20]. The independent variables typically addressed manipulations to source (e.g. credibility, attractiveness, etc), message (e.g. number of arguments), recipient (e.g. prior knowledge) and channel (e.g. written, oral communication). Even variables that intuitively should work (for example, associating a persuasive message with an expert source) produced increased persuasion in some situations [16], had no effect on others [31] and even resulted in decreased persuasion on others yet [35].

Later research was able to incorporate the different results under the same conceptual umbrella by realizing that there are two different cognitive processes that can be used in the decision making process [26]. The first one involves deeply scrutinizing the arguments in a persuasive message and requires that

the individual is *motivated* and has the necessary *ability* to do so. In the second, attitude change occurs without the individual looking carefully at the true merits of a message, either because he/she lacks the ability or motivation to do so. In this second process, peripheral cues (such as the expertise of the source of the message) are determinant of the attitude change.

For the first process to occur we need to be both able and motivated to process the message that is relevant to our decision. Imagine you are playing a storytelling game where you have to make a decision that may lead to the main character's wife dying, and consequently you losing the game and having to start over. Imagine that the choice was about which medicine bottle to give her among several choices, and that each medicine bottle had information that you had to understand in order to choose the right one. Because it is a decision with a considerable impact (if done wrong we have to start over) we are likely to truly consider all the arguments that are relevant for our choice amongst our options.

The second process occurs when we lack the motivation or ability to process the relevant arguments. Imagine the decision process employed by a child of young age in deciding about a new toy. Lacking the cognitive skills to truly grasp the benefits of a particular toy over another he/she will rely on cues to make his/her decision, such as which one feels "good" or "bad", or the one that has the most appealing visual characteristics. Surprisingly adults also apply this process. If we had to deeply scrutinize all the arguments in favor and against every decision we make, we would have severe difficulties in handling the demands of our everyday life (cf. [20] "lazy organism"). Returning to the storytelling game example, imagine that we lacked the motivation to deeply consider the arguments in favor of each option, for example, because we could save the game and try each medicine until we got the right one (and therefore avoiding the hassle of having to start over). Since in that situation the importance of making the wrong choice has no considerable impact, we are more likely to base our choice in other factors (cues), if they are presented to us. For example we would probably follow the advice given by a character presented to us as a healer (expert source in medicine) without giving much thought about it.

The theory that first explicitly identified these two different processes is named Elaboration Likelihood Model of persuasion (ELM) [26]. Accordingly to ELM, when we are likely to scrutinize the aspects relevant to the object of our decision, we say that the *elaboration likelihood* is high. Contrary, if we are unlikely to attend to the relevant aspects of the object of decision we say the *elaboration likelihood* is low.

Having this in mind it is important to note that even though we might be able to produce messages (e.g. using thought-listing) that have predictable cognitive responses, they may still be ineffective in gearing the user towards the author's intended direction. To be truly successful in persuading the user it is necessary that he/she not only is motivated but has the ability to process the message or, in the case where he/she is unable to do so, there is a cue (e.g. associating the message with an expert source) that still leads the user to decide in the author-intended direction [33].

4.1 Affecting Elaboration Likelihood

As mentioned earlier the effect of the quality of the arguments contained in the message is directly influenced by our ability to understand them and the amount of cognitive effort we are willing to employ to process them. One straightforward manipulation that can be used to affect motivation and therefore the likelihood of the user processing the message is to manipulate the perceived personal relevance/involvement of the advocacy contained in it [24]. For example, in [24] the authors were able to show that personal involvement can be used to manipulate motivation and consequently the likelihood of the message being scrutinized, and therefore enhance the effects of a message when involvement is increased (e.g. a message eliciting favoring thoughts will elicit even more; a message eliciting unfavorable thoughts elicits even more unfavorable thoughts) or decrease the effect of the message by decreasing involvement. In the context of interactive storytelling this could be achieved, for example, by increasing or decreasing the perceived consequences of a decision.

Another way of affecting motivation is through the perception of personal responsibility [30] [17]. Personal responsibility is related to the degree to which the responsibilities concerning a task are shared. This effect manifests itself in most individuals even if the shared responsibility is only illusional [12]. When responsibility is perceived as being shared, people have a tendency to employ less cognitive effort.

There are other ways to affect the amount of scrutiny performed when a subject is exposed to a persuasive message, namely it was shown that moderate message repetition [5] can be useful when the ability to process the message is limited. Also, distraction has been shown effective in diminishing the amount of thought employed in assessing a persuasive message [1] [28]. Distraction has this effect even in moderate amounts (where the subjects can recall as many arguments as if not distracted) [28].

4.2 Using Cues

When we have limited ability or lack the motivation to attend to all the arguments in a persuasive message, we rely on cues [26]. For example, if we are expected to make a decision about a subject we know nothing about, but that is presented to us by a source that we identify as an expert, we are likely to report more positive attitudes towards what he/she is advocating [29] [27].

As like source expertise, source attractiveness [29] and the visual prominence [3] have been shown to effectively affect the perception of the message in low elaboration conditions.

Another useful cue is related to the form of the message itself. By increasing the number of arguments (without conveying more information) it was shown that when motivation and/or ability to elaborate on the message was low, attitudes were more favorable [25].

There are other additional less straightforward cues that can influence user's decisions in an interactive storytelling context. For example, social dynamics

such as reciprocity and patterns of behavior that can be elicited by using identifiable social roles have been shown to successfully influence behavior [10] and have been inclusively explored in a storytelling context [32].

5 Using Persuasion in Interactive Storytelling

These mechanisms of persuasion can be explored in a system that dynamically selects persuasive manipulations (which can be performed by characters, events in the story, etc) in order to lead the user through a certain path. In its simplest form this approach could be employed in a branching narrative story with several decision points. In each decision point several manipulations can be prepared so that they can be applied in run-time according to some author-defined criteria. For example, where possible, two messages can be created in each decision point, one strong (that generates mostly favorable cognitive responses regarding choosing a particular option) and one weak (that generates mostly negative cognitive responses). Also several other manipulations can be added, such as manipulations of personal relevance/involvement, source and responsibility. As a general example, imagine a story whose decision points could be described by Figure 1. Each node represents a particular point in the story where several decisions can be made, where each decision (arc) leads to another point in the story (node).

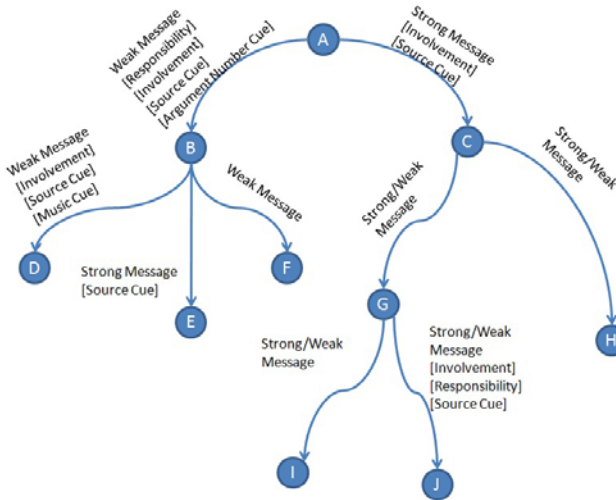


Fig. 1. A branching story and persuasive content at each decision point

Imagine we would be interested that the user would choose path ACGJ. To achieve this we could make the system choose the persuasive manipulations at each decision point depicted in Figure 2(a). For example, in decision point A the system having available a *weak message* regarding decision point B together with a *responsibility, involvement, source* and *argument number manipulations*

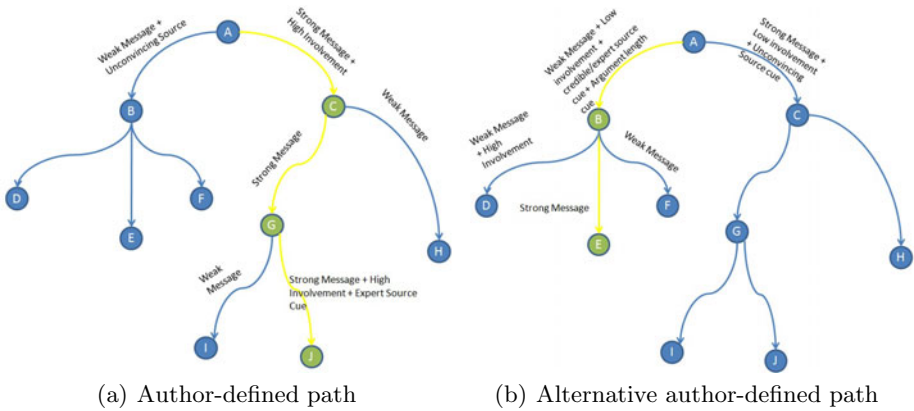


Fig. 2. Two possible paths through the story

could choose to present the user with the *weak message* together with a *unconvincing source manipulation* in order to discourage the user in choosing this particular path. Because the intended path requires the user to choose C in node A the system could select the *strong message* together with the *increased involvement manipulation* to increase the likelihood of the user choosing this path. In contrast, imagine that instead of ACGJ we were interested that the user would choose path ABE (Figure 2(b)). In this case, because we only have a *weak message* available for decision point B we can pair it with a *low involvement/relevance manipulation* (to decrease the likelihood of the message’s scrutiny) together with an *expert source* and *argument number cue* (alternative version of the weak message with more lengthy wordy arguments [25]) and to persuade the user into not choosing the decision that leads to C, the system could pair the *strong message* with *low involvement* (to lower the likelihood of scrutiny) and an *unconvincing source* (that should be determinant of the decision when the likelihood of scrutiny by the user is low [27]).

5.1 Pilot Study

As a first step in assessing the applicability of the aforementioned ideas in a interactive storytelling context, we created a branching story (comparable to a choose your own adventure story) with 8 decision points. The story takes place in the medieval era, where the main character is an adventurer whose goal is to save the people of a small town named *Oakbridge* from a tyrant that lives in a dungeon nearby (typical setting for this genre). As in the choose your own adventure books, each node is a descriptive text that presents the user with several options. Each option has a number that identifies the node that it leads to. The user advances in the story by making a choice in each node until he/she eventually reaches a node which represents a goal state.

The study involved 16 computer science graduate and undergraduate students, with mean age 25 years. The subjects were divided in a control group (6 male, 1

female) that played a version with no manipulations and a test group (7 male, 2 female) that played a version with manipulations. Each subject reported their choices at each decision point and at the end, each filled a questionnaire based on [6] where they listed their thoughts while making the particular decision that was manipulated in the test group.

Our intent was to influence the user in choosing a particular option in a critical part of the story by employing a source expertise manipulation [29]. Source expertise is a peripheral cue [27], so it is likely to be effective under situations where motivation and/or ability to process the relevant arguments for the decision are low. The message was purposely made ambiguous (generating sensibly the same number of thoughts in favor as against as confirmed by thought-listing) that way creating a situation where the subject's ability to choose the right option was low. The non-manipulated message was:

"...There's a dark passageway there, and someone is hidden inside! With fear that the guards take notice of you, you enter it. Inside there's a man who's whispering come here! He says that you should go to the armory where there are magical items that can help you. He then describes the path from there to the armory. As he finishes, you hear footsteps and before you know it he is gone. You wait silently until you cannot hear footsteps anymore. While you wait you ponder on what the man has told you. Will you:

Go back and attack however is walking along the passageway (turn to 4), Try to silently pass through the guards (turn to 7), Try the path to the armory (turn to 5), Carefully retrace your steps back (turn to 3)"

The source expertise message included this additional information, that establishes the man in the story as an expert source:

".... Inside there's a man who is whispering come here! You go to him and he says he's from Oakbridge and that he was an adventurer like you, he says he's been trapped inside for a very long time, more than he can remember. He says that..."

In the control group subjects option were not consensual, 62,5% chose option 5 (which was the advice given by the "neutral" character) and 37,5% chose some other option. The results of the thought-listing questionnaire indicate that when people follow the advice from the character they choose to do so because they infer that "he must not be an enemy or else he would have called the guards". When they choose not to trust the character they report thoughts such as "he might be an enemy" or that they "feel unsafe". It is interesting to mention that the author of this story did not consider that the players would speculate that the man would certainly not be an enemy. Another interesting result is that in all cases the thoughts reported were in accordance with the option taken or were irrelevant to the story, which is an encouraging result regarding the production and testing of messages that the author expects to have a particular effect.

In the test group, where the character in the story was described as an expert source, 88,9% of the subjects followed his advice and 11,1% did not (only one individual), which represents a 26,4% increase with respect to the control group. The thought-listing results indicate that the vast majority of subjects did not

raise any suspicions about the advice given by the character. Also the only individual that did not follow the intended path listed only thoughts that were unrelated to his/her choice, suggesting that the choice might have been random or there was some misinterpretation of the text.

In sum, although not sufficient in number to be significant, results are promising with regards to the expert source manipulation being effective in steering the user to the intended option.

6 Conclusions and Future Work

In this paper we have focused on how user's choices can be influenced in the context of interactive storytelling using results from the social psychology's area of persuasion. We describe the cognitive aspects of choice and address the issues involved in influencing them. We describe a small study where we have successfully used an expert source manipulation to increase the likelihood of the user following a particular path in a branching story.

As the next step in our future work we plan to develop a computational version where we can not only test other manipulations (such as personal relevance, responsibility, repetition, distraction, etc) and how well they interact, in order to define a criteria for combining them dynamically. We also plan to test author-defined criteria to guide the story, such as adjusting the path the user is pursuing accordingly to the nature of his/her actions. For example, an interesting hypothesis to explore that might lead to increased user satisfaction is to provide persuasive manipulations that resonate with previous player's choices, such as, if the player has shown an incline to choose to do good instead of evil, the system can encourage that behavior through correspondently chosen persuasive communications in the decision points where that is possible.

Our ultimate goal is to provide a model that allows a system to dynamically select previously fabricated content capable of steering the user through a path that is defined by some criteria established by an author.

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