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ABSTRACT

This research-in-progress paper reports an experimental study that investigates two research problems: first, how does narrative structure impact the experience of role-playing games (RPGs)? And second, what are the effects of salient decision points on players' perceptions of narrative structure and game play? Can players perceive branching narrative without salient decision points? Previous research literature was reviewed, two hypotheses were developed based on prior research, and an experiment was designed to test these two hypotheses. The findings will likely shed light on the development of narrative and feedback structures in RPGs and other allied fields, such as digital media, virtual reality, and human-computer interaction.

Keywords

Narrative structure, branching narrative, salient decision points, RPG

INTRODUCTION

Narratives play an important role in role playing games (RPG). RPGs may heighten role-play through delivering more coherent narrative experiences compared to other game genres. Ip's (2011) survey of narrative mechanisms in games showed that RPGs demonstrated the widest per-game range of narrative mechanisms. RPGs were found to devote more total average play-through time to embedded narrative content than other genres (Ip, 2011). Pre-game stories, in the form of video and text describing player motivation and game setting, have been shown to cause a significant increase in positive game evaluations, and elevated presence levels (Park, Lee, Jin, and Kang, 2010). Schneider, Lang, Shin, and Bradley (2004) found significantly elevated levels of identification and higher levels of presence in story-based (embedded narrative) games than non-story based games.

The development of immersive narrative experiences and the use of narrative contexts to augment interactive experiences have been research subjects in numerous fields within digital media, including presence studies, ludology, and human-computer interaction. Narrative structure is generally described as the framework that underlies and dictates the order and manner through which stories are presented to a reader, listener, or viewer. A non-linear narrative is one that does not proceed in a straight-line, step-by-step fashion, such as where an author creates a story's ending before the middle is finished. Non-linear narrative can refer to increased spatial and temporal freedom within a textual (virtual) space, or refer to under-determined structures such as postmodern hypertext (Murray, 1997) in which randomness is present. We define branching narrative structures as a distinct subset of non-linear narrative structures. We alternately define linear narrative structures as those having only a single authored story direction, as Aarseth (1997) has disputed the concept of linearity across media.

In computer games, branching narrative structures are operationalized through pre-plotted nodes. These nodes, when reached, determine the subsequent authored narrative content (story branch). Nodes have classically been comprised of salient decision points, which force users to choose among specific possibilities. Unlike some other non-linear narrative structures, users of branching narratives are constrained to the structure of the branching story graph such that if they make the same choices at each decision point, they'll have identical experiences with the system (Riedl and Young, 2006). Complex branching narrative structures in role-playing games offer the potential to make computations when story nodes are reached. For example, interactions between ludonarrative and player-character variables can determine the array of player choices, alter the narrative outcomes for necessarily pre-determined player choices, or eschew player choices altogether while still responding meaningfully to the game state.

Branching narrative structures in different media offer two inter-dependent promises: users can experience a dynamic story that unfolds in realistic, individualized directions; and users can experience narrative causal agency, which mediates the experience of the story. Ryan (2001) suggests that the structure of the interactive narrative itself is of more interest to the

user than the plot on its own. There is little empirical inquiry, however, regarding the effects of branching narratives on computer game play despite all of the speculations (e.g. Ip., 2010; Riedl and Young, 2006; Ryan, 2001).

The popularity of RPGs with branching narratives has led to an emergent on-line realism judgment colloquially called the 'Illusion of Choice' (Everett, 2010; Walden, 2011). This specific realism judgment is noted to be most frequently elicited within the context of secondary story runs when supposedly conflicting narrative branches do not appear to users as sufficiently different from their initial story run. In other words, salient decision points cause players to perceive higher levels of narrative complexity (more possible story branches) than are actually present. This phenomenon brings up some interesting research questions: what are the effects of salient decision points? How effectively can salient decision points change game players' perceptions of the narrative structure?

This research-in-progress attempts to investigate two research problems: 1) how does the narrative structure impact the computer game play of RPGs? And 2) what are the effects of salient decision points on players' perception of narrative structure and game play? Can players perceive a branching narrative structure without salient decision points? How do salient decision points affect presence and judgments of narrative complexity? The findings are expected to shed lights on the development of narratives in RPGs and possibly in other allied fields such as digital media, virtual reality, and human-computer interaction.

LITERATURE REVIEW

The literature review examines prior research on video game narratives, RPGs, and relationships between branching narratives and RPGs.

Murray (1997) defines causal-agency as the satisfying power to take meaningful action and see the results of one's decisions and choices. Effectance refers to the phenomenological experience of causal-agency and it facilitates the perception of being in control (Klimmt, Hartman, and Frey, 2007).

Salen and Zimmerman (2003) suggest two inter-dependent narrative conditions in games: embedded narrative (or pre-authored), and emergent narrative (or ludonarrative, simulation). Embedded narrative is designed to provide motivation for game events and actions. It structures a player's interaction and movement through the game world in a meaningful way. Emergent narrative arises from context-dependent interactions, and the embedded narrative frame contextualizes all of the emergent events that happen during play (Salen and Zimmerman, 2003). Moreover, embedded narrative acts as a tangible reward for achieving a game goal (Salen and Zimmerman, 2003). Embedded narrative thus works to communicate abstract dimensions of causal-agency, meaningfully communicating the link between narrative progression and the immediate effectance, which is intrinsic to game-world interactions and is what qualifies such interactions as 'game-play' rather than mere activity (Murray, 1997).

Previous research shows a consistent correlation between embedded narrative contexts and experiences of presence and engagement in both video games and immersive simulations (virtual reality). Pre-game stories, in the form of video and texts describing player motivation and game setting, have been shown to cause a significant increase in positive game evaluations, and elevated presence levels (Park, Lee, Jin, and Kang, 2010). Schneider, Lang, Shin, and Bradley (2004) found significantly elevated identification and higher levels of presence in story-based (embedded narrative) games than non-story-based games. The inclusion of narrative in a navigational simulation has been found to have a significant effect on both self-reported presence and on participant heart-rate variations when encountering a virtual character (Gorini et al., 2011).

Ip (2011) claims that branching narrative structures represent a significant contribution to interactive storytelling. Riedl and Young (2006) note that branching narratives are classically represented as directed graphs in which each node represents a linear, scripted scene followed by a decision point. Arcs between nodes represent the narrative feedback (story progression) based on decisions a user can make. Conscious user choices at decision points determine the subsequent narrative directions among possible alternative 'branches' of content. Through salient decision points and meaningful narrative feedback, branching narrative structures incite the unique experience of narrative effectance. The two fundamental promises of branching narrative structures are: the story follows a path that is of greater intrinsic interest to the user and/or more situationally appropriate for the user-defined character; and the immersive experience of narrative effectance, which mediates the experience of the story and facilitates role-play.

Biocca (2002) states that interpolating users into 'role-playing interactors' strikes at the very heart of human identity exploration, experimentation, and formation. As environments increase in their level of mediation, the psychological impact of role-playing may be heightened (Biocca, 2002). RPGs (compared to other game genres) are thought to increase the phenomenological experience of role-play by increased attention on user defined character variables. Anecdotal claims

suggest that 20% of total game play delineated to character modification (Bissel, 2010), and the “level-up” in RPGs has been empirically shown as an important motivator and reward (Guo et al., 2009).

RPGs may heighten role-play through delivering more coherent narrative experiences than other genres. Ip's (2011) survey of narrative mechanisms in games showed that RPGs demonstrated the widest per-game range of narrative mechanisms. RPGs were found to devote more total average play-through time to embedded narrative content than other genres (Ip, 2011). Ryan (as cited by Brown, 2008) considers complex branching narrative structures in RPGs to be approaching the “ultimate goal of art” in virtual-reality: a seamless merging of narrative and simulation that preserves both a coherent narrative structure and the ability for the user to influence the progression of the story. Richness experienced during game play relates to perceived complexities, and is associated with an increase of the degrees of freedom to which a game can be manipulated (Rozendaal, Keyson, Ridder, and Craig, 2009). Rozendaal et al. (2009) found that experienced richness promotes engagement due to the excitement experienced when perceiving a game's potential for developing human faculties.

A case study on nonlinear narrative experiences congruently found that players did want to feel free to choose their own pathway, but they did not want complete freedom, without direction (Mallon and Webb, 2006).

Riedl and Young (2006) argue that regardless of the complexity of a branching narrative structure, a single interactive system story run is always experienced as linear by the user. In order to determine whether the user's experience is compelling or engaging, one must analyze individual paths through the branching story structure. In other words, the eventual path through the story branches is not determined in advance, but is always retroactively linear. Dialectically speaking, the branching structure itself acts to mediate potential transportation into an otherwise linear story. This mediation comes in two forms: first, the story follows a path that is of greater intrinsic interest to the user, or more situationally appropriate for the user-defined character; and second, the branching structure incites the real-time construction of mental models for causal-agency and narrative complexity, which facilitate the experience of immersive narrative effectence.

Little research has explored the on-line construction of mental models for causal-agency and narrative complexity in branching narratives. Riedl and Young (2006) suggest that more decision points and higher complexity correlate directly with the user's perception of control (narrative effectence) in branching narrative. Busselle and Bilandzic (2008) note that psychologists conceive of narrative processing as an active process that occurs as the audience member constructs or realizes the story from the text through mental models. The construction of mental models can be explored through on-line realism judgments, which occur as one constructs and reconstructs the mental models necessary to understand a narrative (Busselle and Bilandzic, 2008). Online realism judgments are made while the viewer is engaged with a narrative, are likely to be focused on a specific instance or moment within the narrative, and are unlikely to be positive (Busselle and Bilandzic, 2008). Researchers (Everett, 2010; Walden, 2011) have observed an emerging online realism judgment, known as “Illusion of Choice,” when supposedly conflicting narrative branches do not appear to users as sufficiently different from their initial story run. The existence of this break implies that: 1) perceptions of narrative complexity (amount/variations of possible branches and level of system responsiveness) and causal-agency are inter-dependent; 2) mental models allow perceived narrative complexity to exceed actual narrative complexity on initial story runs; and 3) perceived narrative complexity is related to automatically imagined alternative choices.

Hartmann, Klimtt, Vorderer (2010) point out that users who enjoy an interactive media offering may become more willing to play around with certain features, to test out new things, and to explore the environment. They suggest that such exploratory behavior could lead to greater engagement, and the experience of presence may thus be fostered or further intensified. In a comparison of viewer responses to branching narrative structures in television among solitary and co-viewing settings, Lee, Heeter, and LaRose (2010) found a significant increase in feelings of joy within both the solitary and co-viewing branching conditions. In contrast, Vesterby, Voss, Hansen, Glenstrup, Hansen, and Rudolph (2005) suggest that the novelty of 'playing' with an interactive narrative system itself may overshadow the user's presence and engagement with the story, and suggest that the “dream-like immersion” in interactive cinema is fatally disrupted by conscious user controls at salient decision points. Vesterby et al (2005) wonder if branching narratives can lead to a variety of engaging new cinematic forms without conscious narrative causal-agency. Vesterby et al. (2005) found that non-aware subjects did not identify the branching structure during viewing and aware-group subjects reported that they spent most of the session looking for feedback on their interactions.

HYPOTHESES

Based on the previous research, two hypotheses are developed:

Hypothesis 1: Branching narrative in an RPG leads to improved enjoyment of game play compared to linear narrative.

Branching narrative presents a higher level of task complexity than linear narrative by providing more choices/alternatives. Perceived complexities in RPGs are associated to perceived richness, engagement, and an increase of the degrees of freedom to which a game can be manipulated (Rozendaal et al., 2009). A case study on nonlinear narrative experiences found that players did want to feel free to choose their own pathway (Mallon and Webb, 2006). Ryan (2001) suggests that the structure of the interactive narrative itself is of more interest to the user than the plot on its own. Higher perceived richness, elevated engagement, and increased sense of control (freedom) will result in higher level of enjoyment of game play.

Hypothesis 2: Presence of salient decision points in a RPG game improves enjoyment of game play.

Salient decision points in branching structures have been speculated to cause breaks in presence across media, especially within immersive virtual-reality simulations and interactive cinema (Vesterby, Voss, Hansen, Glenstrup, Hansen, and Rudolph, 2005). Research in game engagement suggests that salient decision points can potentially increase feelings of effectance (the experience of causal agency) and increase the perception of game complexity (Reidl and Young, 2006). The presence of salient decision points should facilitate the automatic construction of mental models for narrative complexity and causal agency (Busselle and Bilandzic, 2008). Both effectance and perception of game complexity can facilitate sustained engagement and presence (Rozendaal, Keyson, Ridder, and Craig, 2009; Hartmann, Klimtt, Vorderer, 2010). Research also suggests that explicitly communicated branching narrative structures can increase the experience of role-playing (Rydell and Young, 2006; Biocca, 2002).

METHOD

A controlled experiment will be conducted to test the two hypotheses proposed in Section 3. Details of this experiment are discussed below.

Participants

Students in a large urban university in the Midwestern U.S. will be recruited as participants of this experiment. The student body in this institution is known for its diversity in terms of age, gender, ethnicity, and academic discipline. The diversity of participants helps boost the generalizability of the findings.

Experiment Design/Independent Variables

There are two independent variables in this experiment: narrative structure and the presence of salient decision points. Narrative structure has two treatment levels: branching vs. linear. Branching refers to the consecutive viewing of mutually exclusive narrative branches, while linear refers to the viewing of a singular narrative branch. Presence of salient decision points also has two levels: yes vs. no. Table 1 shows the 2x2 factorial experiment design.

	No Salient Decision Points	Salient Decision Points
Linear Narrative	Group 1	Group 2
Branching Narrative	Group 3	Group 4

Table 1. Experiment Design

Dependent Variables

The following three dependent variables will be measured as the responses of participants to different treatment conditions: enjoyment, flow, and perception of narrative structure.

Enjoyment of computer game play reflects the overall responses of participants to a game. It will be measured through a survey instrument developed and validated by Fang, Chan, Brzezinski, and Nair (2010). This instrument contains 11 items measuring affective, behavioral, and cognitive reactions of computer game play.

Flow during game play will be measured through an instrument developed and validated by Zhang, Fang, and Chan (2011). Although enjoyment is measured to reflect the overall experience during game play, it is believed that measurement of flow may help us understand what may have happened during game play. This instrument has 23 items.

Perception of narrative structure will be assessed by three questions: “I feel this game is following a linear narrative structure”; “This game seems to have multiple paths/endings.”; and, “The story seems to respond to player actions.” User’s perception of narrative structure plays a pivotal role in computer game play. In the so-called “Illusion of Choice” phenomenon (Everett, 2010; Walden, 2011), player perception of narrative complexity was shown to be greater than the actual narrative complexity. Conversely, every singular story run within a branching structure is retroactively linear, which implies that branching narrative structures will only be apparent to players through specific feedback. Therefore, it is vital to evaluate player’s perception of narrative structure and complexity during game play.

Experiment System

The experiment requires a role-playing game with a branching narrative structure that uses a paraphrased-based dialogue system to present decision points. Paraphrasing is used in some games to facilitate elaborate verbal dialogue between player-characters and non-player characters. It presents players with abridged, context-appropriate categories of response that are then acted by the character as more elaborate dialogue.

Dialogue is the most popular delivery mechanism for decision points. It facilitates immediate system responses that are appropriate for varying conditions of narrative impact. Additionally, we need to visually remove specific choices without presenting the required choice as out of place. Mass Effect 2 was chosen for this experiment.

Mass Effect 2 is a role-playing game developed by Bioware Corp. (a division of Electronic Arts) and released in 2010. It has received near-universal critical acclaim, and is currently the 19th-highest rated game of all time based on cumulative reviews (<http://www.gamerankings.com>). It was released on Xbox 360, PC, and Playstation 3, and has sold 3.8 million copies across platforms (www.vgchartz.com). The game features extensive character customization, a branching narrative structure operationalized by decision points, usually during dialogue, and a 'karma-system' which allows the game-world and non-player characters to respond intelligently to patterns in player choices. The game also features a paraphrased dialogue system (Bissel, 2010) which allows for the player-characters to be voice acted, and for text-based choices in dialogue to be expanded upon into complex verbal conversation. In Mass Effect 2, all players are required to eventually complete the same basic missions, but 'Paragon and 'Renegade' decisions illicit different narrative feedback, and create contextually different story arcs.

In order to better control the four experiment conditions, participants will only be asked to view pre-recorded play sessions and will not actually play the game. Two full play-throughs of a single 'mission' will be recorded. The 'mission' includes its own story arcs and conclusions. One play-through will include only 'paragon' decisions (leading to paragon feedback and conclusion), and the other play-through will include only 'renegade' decisions (leading to renegade feedback and conclusion). Feedback comes in the form of cut-scenes, and paraphrased character dialogue made by the player-character, and dialogue from non-player characters.

Possible decisions will be redacted from some videos, leaving only the choice necessary to drive the plot and maintain continuity. The salience of decision points will be augmented in some videos through icons. Mental models for narrative complexity automatic

Play-throughs will be edited into the following 6 videos:

- 1) Video 1 will show the 'paragon' decisions being made at salient decision points, and show the 'paragon' feedback.
- 2) Video 2- will show 'renegade' decisions being made at salient decision points, and show the 'renegade' feedback.
- 3) Video 3 will show 'paragon' decisions as singular dialogue prompts, and show the 'paragon' feedback.
- 4) Video 4 will show the 'renegade' decisions as singular dialogue prompts, and show the 'renegade' feedback.
- 5) Video 5 will show the 'paragon' decisions being made at salient decision points, but show the 'renegade' feedback.
- 6) Video 6 will show will show the 'renegade' decisions being made at salient decision points, but show the 'paragon' feedback.

Table 2 shows how the four treatment conditions in the experiment will be implemented.

Procedure

This experiment will be conducted for subjects individually on one computer, one at a time. Each subject is required to submit an online consent form before participating in the experiment. After completing a background questionnaire, the subject will be randomly assigned to one of the four experiment groups/conditions. The experimenter will then brief the subject about what will happen next. Two pre-recorded game play videos will be played uninterrupted and continuously.

There will be no break and no questions will be answered during video playing. Upon finishing the two videos, the subject will be asked to complete a survey on the computer that assesses the three dependent variables. Finally, the experimenter will debrief the participant and collect any additional information missed in the survey.

Treatment Condition	Video Sequence
Group 1 (Linear Narrative with No Salient Decision Points)	Participants will be randomly assigned to view one of the following two videos: • Video 3, twice • Video 4, twice
Group 2 (Linear Narrative with Salient Decision Points)	Participants will be randomly assigned to view one of the following two sets: • Video 1 and Video 6 (in random order) • Video 2 and Video 5 (in random order)
Group 3 (Branching Narrative with No Salient Decision Points)	Participants will view Video 3 and Video 4 in random order.
Group 4 (Branching Narrative with Salient Decision Points)	Participants will view both Video 1 and Video 2 in random order.

Table 2. Implementations of Treatment Conditions

NEXT STEP

We are currently in the process of developing the experiment system. We will soon start the data collection and expect to present some preliminary results during the conference.

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