FEEDBACK BASED INTERACTIVE STORYTELLING:

How does Player Agency influence interactivity and narrative structures in branching narrative games?

Anukriti Gupta, MA Games Design [22018366]

Word Count: 5648

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Introduction

The world of interactive narrative games has evolved significantly over the past two decades. As games become more interactive, there is a large player base that is interested in shaping the stories they experience, making choices that lead to various outcomes. (Crawford, 2004; Aarseth, 2004) This evolution has been driven by the pursuit of player agency - the ability to take meaningful actions and witness the consequences of those choices within the game. The concept of agency lies at the heart of the player's desire for control and power in these interactive narratives. (Harrell & Zhu, 2009)

The narrative wrapper is the foundational element in video games that contextualizes the player's objectives, creating a bridge between the player's actions and the game's magic circle. It acts as a reformatter, enabling players to navigate a story-driven environment instead of manoeuvring abstract game pieces. Storytelling plays a pivotal role in shaping this experience, giving players the illusion of inhabiting and influencing a dynamic narrative universe. However, the synergy between traditional storytelling structures and interactivity isn't always seamless. (Crawford, 2004)

Interactive narratives align well with non-linear or branching structures, allowing players to experience stories from different angles, culminating in various outcomes. The flexibility and complexity of these narratives present a unique challenge. (Palacz, Grabska-Gradzińska, Nowak, Grabska, 2021) While branching narratives increase interactivity, they can quickly become overwhelming since accommodating this increasingly additive approach the designer has to produce extraneous content to fill these additional branches. Each decision point spawns new storylines, forcing designers to create and manage an exponentially expanding narrative web. This complexity can hinder the natural flow of storytelling and challenge the coherence and appeal of the narrative.

However, player agency remains paramount. Players yearn for an experience where their actions hold weight and where they can see their decisions translate into narrative changes. While agency is inherent in a game system, as it is programmed to consistently and immediately respond to the player, Interactive narrative research examines agency according to the Player’s expectation on how the game world reacts to their choices and their perceived control and power over the game world. The dynamics of agency are closely linked to the game's simulation and emergent gameplay, a key concept in video games where narratives emerge from player actions and strategies, rather than being pre-planned by writers or developers.

In the world of interactive narrative games, there exists a challenging dilemma known as the "narrative paradox." This paradox emerges from the tension between a player's desire for freedom and a system's need to structure the gaming experience. To address this paradox, the theories of natural coupling as described in the "Interaction Frogger Framework." can be applied to game design to optimally design Interactive Narrative elements for connecting player actions with narrative information. Feedback plays a pivotal role within this framework, providing players with essential guidance, either through audio-visual cues, narrative dialogue or change in the world state, to maintain a balance between their agency and the overall narrative structure.

Literature Review

The narrative wrapper of a game provides a basic method of contextualizing a game's objective (Myers, 2003; Rollings & Adams, 2003, p. 92), it is the reformatter—something that converts one thinking mechanism to the other, a created solution to an interfacing problem, that arose early in the development of language, that makes chess a game about knights and kings rather than a game about moving wooden pieces around a board. Storytelling is that reformatter. (Crawford, 2004). In the past 20 years, games have become more sophisticated avenues of storytelling, a story where you can play an active part. Back stories and cutscenes have been the primary source of narrative wrappers in linear games (Glassner, 2004, p. 285; Barry Ip, 2011) however, more sophisticated techniques have gradually been developed in the search for more interactivity and one such avenue is the evolution of game structures.

Storytelling structure in Video Games derives heavily from other dynamic media, like theatre, the concepts of Aristotle's "Hero's Journey" and Joseph Campbell's "classic dramatic arc" can be observed across several games. (Barry Ip, 2011) However, such well-defined structures aren't always transferable to interactive media (Koenitz, 2018) The nature of interactions in a narrative signals an affordance that there is scope for a *What If*, pressing a button to initiate tightly-plotted chains of events that may offer little more interaction than someone asking a question in a pre-recorded video because the answer – the output – always remains the same. Creating stories that have space for play, amorphous and malleable event structure, is the challenge for researchers and artists in determining how traditional story forms can be adapted for interactivity. Where some traditional games may be presented in a linear structure typically in the form of levels positioned sequentially, games that claim to contain more complex – more *interactive* - narratives strive toward nonlinear or branching structures. (Ryan 2006, pp. 100-107)

However, the interactivity of branching narratives can also be questioned, branching narratives made solely for the purpose of increasing interactivity can quickly bloat the storytelling process by increasing the workload on the designer and add unnecessary steps between user action and meaningful reaction. (Crawford, 2004) The limitations created by the sheer quantity of content that needs to be produced for each possible player decision, alternative plotlines, and the difficulty of maintaining a coherent and interesting story are all exacerbated by branching (Glassner, 2004, pp. 239-249; Meadows, 2003, p. 66; Ryan, 2006, p. 107)

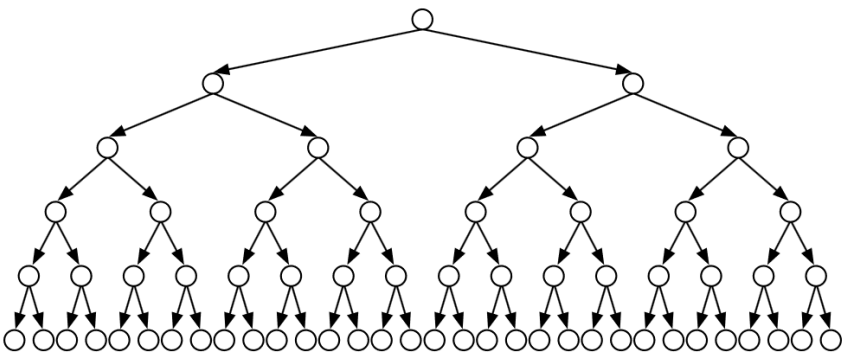


Illustration of Additive approach to branching narrative

Players desire this subjective experience of power and control and thus their actions have to reflect agency to deliver meaningful interaction. Video Game agency has been defined as “the satisfying power to take meaningful action and see the results of our decisions and choices,” (Murray, 1997, p. 126). The sense of power and control that videogames afford must partially come from the fact that the game system, like any computer, responds instantly to our input and consistently responds the same way to the same input. In this way, agency is considered by many to be the natural result of interactivity and therefore inherent to the medium. Simulation is the key concept; it is the dynamic aspect of the game that creates a consistent game world. Simulation in games provides an the alternative mode of storytelling; a bottom up and emergent approach in which players can imbue meaning onto their play. In simulations, knowledge and experience is created by the player's actions and strategies, rather than recreated by a writer or moviemaker. In contrast, most storytelling mediums – including traditional narrative games- stories are built top-down and preplanned by the designers or writers.

Moving beyond the simplified model of agency in games such as discussed above, many interactive narrative researchers perceive a dilemma that has been termed the “narrative paradox,” in which the user’s free will to navigate in, and interact with, a virtual environment is positioned orthogonally to a system’s capacity to narratively structure the user’s experience. (Aylett & Louchart, 200) Many authors seek to provide techniques to balance the two sides of this paradox such as in *Façade* (Mateas, Stern, 2021), (Cavazza, Charles, & Mead, 2001 and Young, 2007) The architecture built in Facade is one of a highly interactive local agency, where the player can freely input text via a continuous, open-ended natural language Interface as well as the ability to interact freely with the set. The drama manager is built to boil down all player input into 36 basic verbs and accordingly initiates a *story beat,* the story beat is then checked against priority lists and certain beats register a rise in the overall tension score which controls narrative tension within this one act interactive drama. The tight constraints on scope of the game, with a limited interactable cast and only one stage can help designers limit the number of variations they need to create and map thus challenging the traditional additive nature of branching narratives.

These systems are built with the aim to balance user freedom with the structure of the story by using incentives or restrictions. They reflect a broader view of agency in interactive narratives where Agency is defined within the game structure by (1) the actions users can take, (2) the impact of those actions on the story world and its presentation, and (3) the system's ability to control the story world. The number of ways the system can interpret user action dictates whether events are exclusively dependent on the player (the player makes something happen) or the system combines events happening independently of the player with the player’s ability to actively participate in the event (something is triggered from variables changed by player action). (Domsch, 2013) These complicated systems are essentially based around building a feedback system layered enough to deliver complex narrative information.

Affordances and *Signifiers* in game design (Fagerholt E., Lorentzon M.,2009) coincide with the concept of coupling action and function in the design of mechanical and electronic products, through feedback and feedforward. The interaction of narrative structures in video games can be analysed through the lens of the *Interaction Frogger Framework,* (Wensveen, Djajadiningrat, Overbeeke, 2004) The framework offers six practical characteristics for connecting action and information, encouraging designers to explore couplings that lead to

embodied freedom of interaction which is similar to the concept of embodied interaction (Gee, 2008). The given example is of a pair of scissors to illustrate the natural coupling between user action and the product's function, emphasizing six key aspects of this coupling:

1. ***Time****: Actions and reactions occur instantly.*
2. ***Location****: They happen in the same place, even if the user's hand and the actual cut differ.*
3. ***Direction****: The direction of action corresponds to the reaction; moving scissors deeper results in a longer cut.*
4. ***Dynamics****: The dynamics of user actions match the product's response.*
5. ***Modality****: Sensory experiences align – you see, hear, and feel the action's impact.*
6. ***Expression:*** *The reaction reflects the user's action, so hurried actions lead to imperfections.*

Within a computer program such as a video game, *Time, Location* and *Direction* can only be signalled through audio-visual-spatial cues. Recent advances in interactive narratives have explored *Modality* and *Expression* through exploring ethical choices in their narratives and presenting the player with moral dilemmas as choices (Consalvo, Busch, & Jong, 2019).

The framework suggests that when it is not possible for designers to establish direct couplings between action and reaction, functional information is needed by the user to guide their actions towards the intended function. This is the area of feedback and feedforward, any level of feedback emphasises affordances (similar to *feedforward*) in a simulated world, when the game signals that an important dilemma discussed in a cutscene is the basis for an upcoming choice or narrative branch in the game (inherent feedforward) the player's agency is reinforced and if after the choice the game signals a change in companion relationship or change in world state (augmented feedback) the player unpredictability can be influenced towards a certain route within the game. If feedback is applied properly, on all six aspects, the player can not only be guided towards the optimal narrative path but the satisfaction of choice can also be increased. The concept of choice and consequence has been a huge selling point for interactive narrative games and this often sets the scope of the game, the designer can attempt to predict the route most players will take by scripting feedback that would call to the players morality or even their emotion.

The importance of feedback in a game is immeasurable, especially when players find themselves less restrained by the game's physics, the feedback needs to be designed to reiterate limitations and restrictions on to the player in order to make sure the interplay between system agency and player agency translates back as functional information. When adapting narrative structures for interactivity, the coupling of agency and feedback can provide scope and narrative control for designers within the infinitely expanding branches of interactive storytelling.

Methodology

In order to select games for analysis on Player Agency, the corelation between Player Interactivity and Player agency must be evaluated on a wide spectrum of branching narrative games, specifically ones with multiple endings and Player Choice as a core mechanic. The following games have been selected based on observational experience:

Fallout New Vegas (2010), Divinity Original Sin (2014), Assassin's Creed Odyssey (2018), Disco Elysium (2019), Life is Strange (2015), Infamous Second Son (2014), The Quarry

(2022), Heavy Rain (2010), Mass Effect 2 (2010), Dragon Age Origins (2009), Dishonored (2012), Until Dawn (2015), L.A Noire (2011), GTA VI (2008)

The wide spectrum of games are selected based on the different kinds of agency reflected within their interface, narrative structures and balance of choices and consequences.

The prologues of each game are evaluated by examining the ratio of player input to system input. Each game was assessed and categorized with a "yes" or "no" statement based on the affordances observed within these following five interactive elements across the games (Refer to Figure 2.a for details).

1. Character Creator: *what does the character creator allow?*
    a. Cosmetic Changes
    b. Attribute Changes
    c. Player Character Model
    d. Player Narrative Backstory
2. Dialogue Interactions: *how does the game present dialogue input?*
    a. Dichotomy: between 2 choices at one time
    b. Branch: multiple choices with structured loop or gate within the narrative.
    c. Dialogue Wheel: multiple options that system evaluates based on emotion
    d. Real Time Input: Quick Time Events (QTEs), Haptic Response
3. NPC Interactions: *what degree of control does the game system exert on NPC interactions?*
    a. Scripted: Cutscenes, railroaded and game directed NPC interaction
    b. Selection: Free select and interact with NPCs
    c. Recruit: Add NPCs to player party
    d. Control: Control NPCs
4. Skills: *what amount of change does the game allow in gameplay specific interactions?*
    a. Start with a defined list of game world interactions and limitations
    b. Select your own list of game world interactions and limitations
    c. Select play style, balance your own gameplay
    d. Skill tree i.e can upgrade skills with in built balance
5. Object Interaction: *what can the player manipulate in the simulation?*
    a. Look/Inspect/Examine
    b. Interact/Use
    c. Equip
    d. Combine/Craft/Apply creatively

To be able to compare interactivity to agency, evaluations of each of these five interactive elements and their associated affordances is further conducted, taking into account their impact on the following aspects (See Figure 2.a):

1. Visual: *What kind of changes can the player observe?*
    a. Cutscenes
    b. User Interface (UI) feedback
    c. Changes in the interface driven by player choices
    d. Animation
2. Ludic: *What changes are applied to gameplay?*
    a. Customization options affecting gameplay
    b. The ability to modify playstyle within the constraints of game mechanics
3. Narrative: *What changes are applied to the story?*
    a. Alterations in the branching of the storyline

    b. Scripted behaviors of in-game companions
    c. Player evaluation leading to character reactions (liking or disliking)
4. Gameworld: What changes are applied to the interactable world?
    a. Changes in the game world map
    b. Implications on branching paths
    c. Influence on the survival of non-player characters (NPCs)

These evaluations were instrumental in understanding how interactive elements impact various facets of the gaming experience. Once we establish the range of player interactivity and agency, we will proceed with a secondary game selection. This step aims to mitigate the potential influence of fundamental differences in gameplay experiences, such as the distinction between Interactive Dramas and Open World Games.

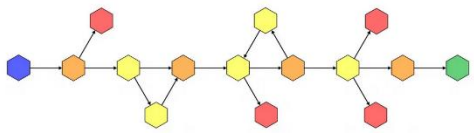
For instance, both "Heavy Rain" and "Until Dawn" fall into the category of Interactive Dramas. However, variations in player agency exist due to the gap covered by feedback and feedforward mechanisms in some games compared to others. To substantiate this observation, we will conduct comparative analyses of specific sequences in games with similar gameplay experiences.

Moreover, we will delve into the techniques utilized in "Mass Effect 2," a game renowned for its interactive storytelling. Our analysis will focus on understanding how its feedback system operates and the levels it addresses within the game.

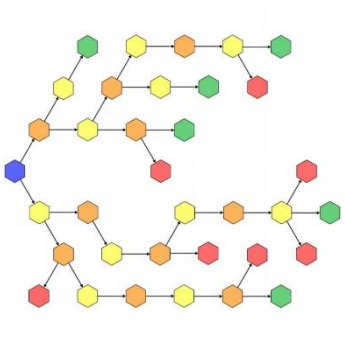
Case Study & Discussion

The whole idea of interactivity is it responds to each person individually. Accordingly, you cannot structure narrative in a truly interactive game without factoring in player individuality. (Crawford, 2004) The first amendment when considering improving interactivity is to increase the number of choices the player can make, more options in dialogue, more paths in a story graph, the number of epilogues etc. which can help enhance the feeling of interactivity but this kind of additive approach is not conducive for a coherent narrative even when done through an AI led generative model. (Ip, 2011; Crawford, 2004)

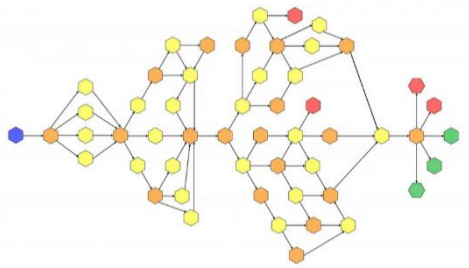
To combat this infinitely multiplying story graph, non-linear story designers tend to stick to now well-established story graphs as shown below
(Meer, 2019; Ashwell, 2015)



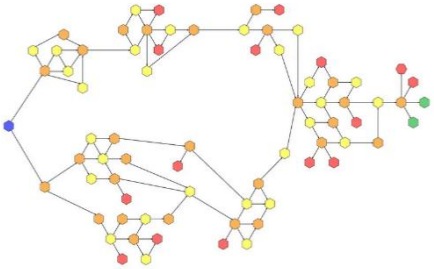
Trial Narrative: Choose-Your-Own adventure, dichotomy in choices



Open-World Tree: Multiple Endings, Fixed Starting point, Equal weight in Choices and Consequences



Branch & Gate: Linear Path with Choices on how to reach the next gate, also known as foldback structures (Crawford,2004)



Open Word Adventure: Node based mapping of choices, each node is a self-contained experience that can loopback to pseudo gates

The existence of a coherent narrative needs to be pre-scripted within the game before any non-linear elements are added whether through the player or the drama agent. Therefore, narrative designers tend to build story by establishing an optimal route/linear path and then adding branches to it. (Crawford, 2004; DeCuir, Hindpere, n.d) When games structure their narratives like this, they are designing backwards, a phenomenon which can been observed through the Four Levels of Interaction Design (Spierling,2005) Though more points of interaction don't automatically suggest more agency, it can be argued that games differ on a range of low to high interactivity and static to dynamic agency. (Domsch, 2017)

Within the prologues, the first expression of where the player stands on that range of interactivity and agency is the made; As the story goal of the game is revealed, the range of interactions available to the player slowly become accessible simultaneously.

Figure 1.a: Character Customisation

Figure 1.b: Attribute Customisation

Figure 1.c: Skill Selection

Figure 1.d: Trait Selection

Figure 1: Screenshots from Fallout New Vegas Character Creator

A character creator turn by turn provides the player the choice to change their cosmetic appearance (*Figure 1.a*), their gameplay experience (*Figure 1.b, Figure 1.c*) and/or the narrative elements for the playthrough (*Figure 1.d*). The story goal is also described in way which alludes to whether the player can change the world state or not. Thus, explicitly declaring its level of interaction and the level of player agency. Depending on the game, the access to initial choices can differ based on what the player can interact with and what the player can change.

Player Actions

Games	Release Date	Character Creator					Dialogue Interactions					NPC Interaction					Gameplay Interaction					Object Interaction					
		Cosmetic Change	Stat Change	Custom Character	Backstory	Total	Dichotomy	Branches	Dialogue Wheel	Real Time	Total	Scripted	Selection	Recruit	Control	Total	Skill Selection	Playstyle	Exploratic	Gameworld Manipulation	Total	Look	Interact	Equip	Combine	Total	Interactivity Score
Fallout New Vegas	2010	1	1	1	-1	2	-1	1	1	-1	2	-1	1	1	-1	0	1	1	1	-1	2	1	1	1	1	4	10
Divinity Original Sin	2014	1	1	1	1	4	-1	1	1	-1	0	-1	1	1	1	2	1	1	1	1	4	-1	1	1	1	2	12
Assassin's Creed Odyssey	2018	1	-1	-1	-1	-2	-1	1	1	-1	0	1	1	1	-1	2	-1	1	1	1	2	1	1	1	-1	2	4
Disco Elysium	2019	-1	1	-1	-1	-2	-1	1	1	-1	0	-1	1	1	-1	0	1	1	1	-1	2	-1	1	1	-1	0	0
Life is Strange	2015	-1	-1	-1	-1	-4	1	1	-1	-1	0	1	1	-1	-1	0	-1	-1	1	1	0	1	1	-1	-1	0	-4
Infamous Second Son	2014	1	-1	-1	-1	-2	1	1	-1	1	2	1	-1	-1	-1	-2	-1	1	1	1	2	-1	1	-1	-1	-2	-2
The Quarry	2022	-1	-1	-1	-1	-4	1	-1	-1	1	0	1	1	-1	-1	0	-1	-1	1	-1	-2	1	1	1	-1	2	-4
Heavy Rain	2010	-1	-1	-1	-1	-4	-1	1	-1	1	0	1	-1	-1	-1	-2	-1	1	1	-1	2	-1	1	-1	-1	0	-10
Mass Effect 2	2010	1	-1	1	1	2	1	1	1	1	4	1	1	1	-1	2	-1	1	1	-1	0	-1	1	1	-1	0	8
Dragon Age Origins	2009	1	1	1	1	4	1	1	-1	-1	0	1	1	1	-1	4	1	1	1	-1	2	-1	1	1	1	2	12
Dishounored	2012	-1	-1	-1	-1	-4	1	-1	-1	-1	-2	1	1	-1	-1	0	-1	1	1	-1	0	1	1	-1	-1	0	-6
Until Dawn	2015	-1	-1	-1	-1	-4	1	-1	-1	1	0	1	-1	-1	1	0	-1	-1	1	-1	-2	1	1	-1	-1	0	-6
L.A Noire	2011	-1	-1	-1	-1	-4	-1	1	1	1	2	1	-1	-1	-1	-2	-1	-1	1	-1	-2	1	1	-1	-1	0	-6
GTA VI	2008	1	-1	-1	-1	-2	-1	-1	-1	-1	-4	1	1	-1	-1	0	-1	-1	1	1	0	-1	-1	1	-1	-2	-6

Player Agency

Games	Release Date	Character Creator					Dialogue Interactions					NPC Interaction					Gameplay Interaction					Object Interaction					
		Visual	Ludic	Narrative	Game world	Total	Visual	Ludic	Narrative	Game World	Total	Visual	Ludic	Narrative	Game World	Total	Visual	Ludic	Narrative	Game World	Total	Visual	Ludic	Narrative	Game World	Total	Agency Score
Fallout New Vegas	2010	1	1	1	-1	2	-1	1	1	1	2	-1	1	1	1	4	-1	1	1	1	2	1	1	1	1	4	14
Divinity Original Sin	2014	1	1	-1	-1	0	-1	1	1	1	2	-1	1	1	1	2	1	1	1	1	4	1	1	1	1	4	12
Assassin's Creed Odyssey	2018	1	1	1	-1	2	1	-1	1	-1	0	1	-1	1	1	2	1	1	-1	-1	0	1	1	1	1	4	8
Disco Elysium	2019	-1	1	1	-1	0	1	1	1	1	4	1	-1	1	-1	0	-1	1	1	1	2	1	1	1	-1	2	8
Life is Strange	2015	-1	-1	-1	-1	-4	1	1	1	1	4	1	1	1	1	4	-1	-1	1	1	0	-1	-1	1	1	0	4
Infamous Second Son	2014	-1	-1	-1	-1	-4	1	1	1	1	4	1	-1	1	-1	0	1	1	1	-1	2	1	-1	-1	-1	-2	0
The Quarry	2022	-1	-1	-1	-1	-4	1	-1	1	1	2	1	-1	1	1	2	1	-1	1	1	2	1	-1	1	-1	0	2
Heavy Rain	2010	-1	-1	-1	-1	-4	1	-1	1	-1	0	1	-1	-1	-1	-2	1	1	1	-1	2	1	-1	1	1	2	-2
Mass Effect 2	2010	1	1	1	-1	2	1	-1	1	1	2	1	-1	1	1	2	1	1	1	-1	2	1	1	-1	-1	0	8
Dragon Age Origins	2009	1	1	1	1	4	1	-1	1	1	2	1	1	1	-1	4	1	1	1	1	4	1	1	1	-1	2	16
Dishounored	2012	-1	-1	-1	-1	-4	-1	-1	-1	-1	-4	1	1	1	-1	2	1	1	1	1	4	-1	-1	1	-1	-2	-2
Until Dawn	2015	-1	-1	-1	-1	-4	1	1	1	1	4	1	-1	1	-1	0	1	1	1	-1	2	1	1	1	1	4	2
L.A Noire	2011	1	1	-1	-1	0	1	-1	1	1	2	1	-1	1	1	2	-1	1	1	-1	0	1	-1	-1	1	0	4
GTA VI	2008	1	-1	1	-1	0	-1	-1	-1	-1	-4	-1	1	1	1	2	1	-1	1	1	2	1	1	-1	-1	0	0

Figure 2.a: Evaluation on the basis of Interactivity & Agency

The above chart (*Figure 2.a*) evaluates branching narrative games of the past 15 years with multiple endings on a score of interactivity and player agency, based on the range of interactions afforded to them by the game system and the possible changes those interactions can apply on the Visual, Ludic, Narrative and/or Game World aspects of their game. When plotted on a graph of low to high interactivity and static to dynamic agency, we can interpret a corelation between interaction and agency.

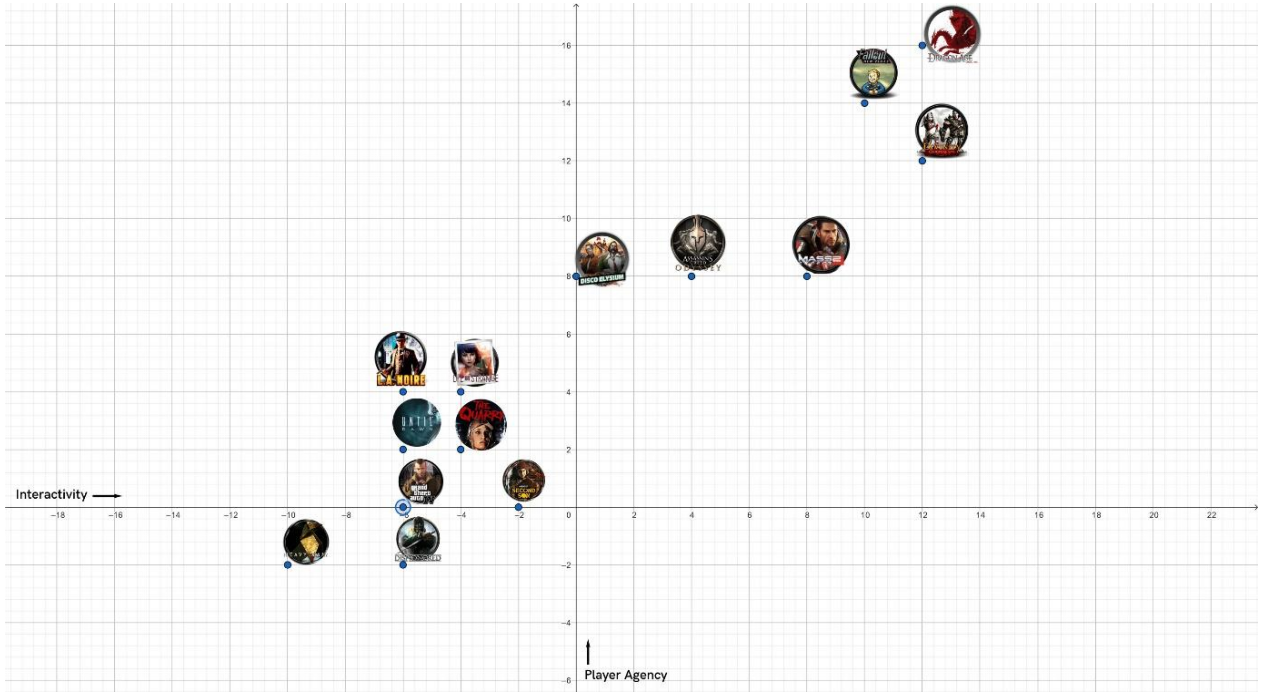


Figure 2.b: XY Graph Plotting Games According to their Interactivity and Agency Score

It can be interpreted that Agency defines how Interactive a game will be. If we compare two games on this graph that have similar user input, we can see how the agency afforded to players affects their choice and consequence in their narrative structures.

Effect on Ludic Structures

Until Dawn (2015) is an interactive drama horror video game developed by Supermassive Games and published by Sony Computer Entertainment for the PlayStation 4. Players assume control of eight young adults who have to survive on Blackwood Mountain when their lives are threatened. The game features a butterfly effect system in which players must make choices that will change the outcome of a scenario. All playable characters can survive or die, depending on the choices made. Players explore the environment from a third-person perspective and find clues that may help solve the mystery.

Heavy Rain (2010) is an action-adventure video game developed by Quantic Dream and published by Sony Computer Entertainment. The game features four protagonists involved with the mystery of the Origami Killer, a serial killer who uses extended periods of rainfall to drown his victims. The player interacts with the game by performing actions highlighted on screen related to motions on the controller, and in some cases, performing a series of quick time events. The player's decisions and actions during the game affect the narrative.

They both offer similar gameplay experiences, with a general linear narrative split up into the perspectives of multiple characters to add non-linearity and they both rely on real time input (the QTEs, Controller sensitivity) to decide the fate of the character you are controlling. There are many sections of Heavy Rain that ultimately don't matter if you get them right or wrong, one of the most prominent examples are the Trials that Ethan Mars has to complete in order to find clues to find his son Shaun Mars. As the player navigates oncoming traffic in a perilous sequence, the interaction within this scene is purely action – all feedback is visual and contained within the cutscene – (Graeber, 2018) not only that, it is never revealed to the player that their choices will narratively end up with the same conclusion. Until Dawn on the other hand employs the narrative wrapper of the butterfly effect to signal to players that the end states don't just depend on surviving scripted sequences but also on the implications of their dialogue choices. The choices in Until Dawn not only reinforce the narrative butterfly effect, there is a separate mechanic where players can find of totem poles that give the player glimpses into how their choices affect the game-state. Due to the lack of natural coupling between player interaction and narrative feedback, Heavy Rain has been criticised about how the perceived control the player has over the game doesn't corelate to the actual control. This can be very frustrating to the player. (Kunzelman, 2020)

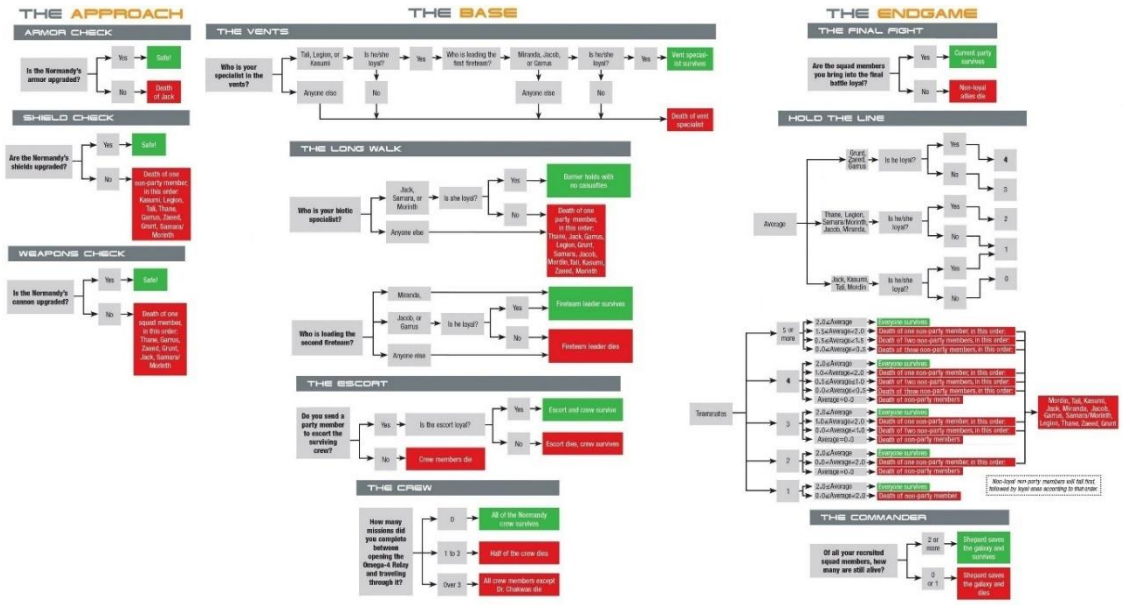
Video games as a storytelling medium must look beyond just interaction and look at the feedforward of the game and further support that with feedback. The affordances need to be structured in a way that the divergence from the optimal path matches the narrative planning and it should flow intuitively with the rest of the gameplay. Interaction design is not something that can be decoupled from storytelling; it is an inherently narrative task. (Koenitz, 2017) Thus when planning the narrative structure, what affordances/feedforward must be placed in gameplay has to be informed by narrative structuring designed in a bottom-up approach.

Working Backwards

Leading your player to one of the numerable possible end states in a game is the goal of narrative structuring. However, in a branching narrative game, especially in an Open World Adventure *(see figure above)*, this requires both careful planning of how goals are achieved and a feedback loop that continually checks player actions and accordingly guides them to the next viable path forward towards the end.

Mass Effect 2 is an action role-playing video game developed by BioWare and published by Electronic Arts in 2010. It is the second instalment in the Mass Effect series and a sequel to the original Mass Effect. The game takes place within the Milky Way galaxy during the 22nd century, where humanity is threatened by an insectoid alien race known as the Collectors. The player assumes the role of Commander Shepard, an elite human soldier who must assemble and gain the loyalty of a diverse team to stop the Collectors in a suicide mission. The Suicide Mission is the final gate to pass before the reaching one of the possible end states, the endings narratively only end in two possible ways: either Shepard destroys the collector base or saves it at behest of a human-supremist criminal organisation named Cerberus. The game reinforces this dilemma throughout the narrative by balancing the "greater [narrative] good" with ethics of working with an organisation like Cerberus, Shepard's companions both recurring from the first Mass Effect and new ones are scripted to provide feedback on the player's choices across the game with each companion falling somewhere on the spectrum of fully supporting Cerberus, disliking Cerberus's methods but supporting Shepard's decisions and actively fighting against the Commander's orders which fall in line with Cerberus ideology.

Mass Effect uses a unique feedback loop of Companion Loyalty where the system checks whether Shepard has completed each companion's narrative quest and whether Shepard has passed a dialogue check which helps retain companion loyalty; which is done by either siding with a companion over another or diffusing the situation if they have enough *Reputation* (either *Paragon* or *Renegade*). (Bizzocchi, 2012)



Graph illustrating the calculations of Mass Effect 2's End State

This graph shows off the three stages of the final mission whose outcome is determined by whether the player passes these checks; These checks are culmination of all decisions the player makes throughout the game and they are reinforced multiple times during the game through Visual, Ludic, Narrative and Gameworld context.

The optimal outcome is to survive with Shepard, all loyal Companions and rescuing the Crew from the Collector ship at the end of the game, so it can be interpreted that in order to construct agency in Mass Effect 2 the designers have to start with what feedback is required to communicate actions that fall in line with the narrative end goal. In order to lead Shepard to a scripted ending the designers utilise feedback systems like Companion Dialogue with structured personalities that can sway Player action, shaping the quest list in a way where some quests are more important for a final outcome than others, timed story arcs to build tension and a final mission that checks each big Player choice and gives them a consequence within the same mission. This is game interactivity given shape by its narrativity and thus building interaction in a game which truly holds up Player agency at its core. (Lowndes, n.d) Interactivity doesn't have to conflict with narrativity if feedback and feedforward is kept at the forefront of the design framework.

Design Framework

Feedback Based Interaction Scoping:

Construct the game's narrative with a strong emphasis on feedback. The story should react to the player's choices and actions, providing meaningful consequences and opportunities for player agency. Feedback mechanisms should be interwoven with the narrative to maintain engagement. Some techniques that can be applied follow:

1. Continuous Player Feedback: Implement a system that continually offers feedback to players regarding their decisions. This feedback should be delivered in real-time, allowing players to understand the impact of their choices as they progress through the game.

2. Narrative-Driven NPCs Relationships: Develop a supporting cast that acts as a feedback system within and in line with the narrative. This performs as the interface which informs the player about their narrative branch and the amount of agency, they have in influencing certain decisions, coupled with adding emotional expression and morality it can be a powerful tool in curbing player unpredictability.

3. Structured Personalities with Feedback Variability: Create companions with distinct, structured personalities that react dynamically to player choices. The feedback delivered by companions should have variability to keep players engaged and curious about the consequences of their actions.

4. Narrative Quests Aligned with Feedback: Design narrative quests that are closely aligned with the feedback system. These quests should both contribute to character development and provide players with insights into the consequences of their choices.

5. Game-Defined Optimal Outcomes: Clearly define optimal outcomes within the narrative, guiding player actions towards these goals. Ensure that feedback and narrative cues support the achievement of these outcomes.

6. Interactivity Progression: Develop a structured progression of interactivity within the game. Start with scripted sequences to introduce players to the narrative, and then gradually increase interactivity as the story unfolds, allowing players to shape the outcome.

7. Dynamic Feedforward Integration: Integrate feedforward or affordances within narrative elements to help players anticipate the consequences of their choices. These feedforward cues should work cohesively with the feedback system to maintain a consistent player experience.

8. Scoping Player Interaction: Define the boundaries and scope of player interaction. While offering choices is crucial, set clear limits to maintain the narrative's coherence. Ensure that feedback reflects the scope of interaction and the consequences of choices made within these boundaries.

9. Narrative-Driven Affordances: Design affordances that align with the narrative structure. The divergence from the optimal path should match the narrative planning while flowing intuitively with the rest of the gameplay.

10. Balancing Interactivity and Narrativity: Continually balance interactivity and narrativity throughout the game, adapting feedback and feedforward to ensure players are engaged with the story while making meaningful choices.

This framework highlights the importance of feedback in narrative design and how it can be used to guide and scope player interaction. By incorporating feedback at every stage and ensuring it aligns with the narrative structure, game designers can strike a balance between player agency and coherent storytelling while keeping players engaged and informed about the consequences of their choices.

Conclusion

In the realm of interactive storytelling, one fundamental element stands out as the linchpin for engaging and meaningful gaming experiences: feedback. As we delve into the narrative construction of a highly interactive branching story, we find that feedback serves as the bridge connecting player choices to the unfolding story. Feedback within games serves as a multifaceted system that continually informs players about the consequences of their decisions. It breathes life into otherwise passive interactions, empowering players with the ability to shape the narrative.

Yet, the role of feedback extends beyond the mere provision of information. It weaves itself into the fabric of the game's narrative, often channelled through NPCs interactions. They offer insight into the player's narrative branch and their influence over key decisions. These NPCs affect the Narrative quests closely was well, making them a crucial feedback system and serving as milestones in the player's journey and thus the narrative of a game. Feedback cues on every level work in tandem to support the player towards solving the puzzle built into the structures of Interactive Narrative, by mapping possible feedback systems early in development of narrative structures the designer is more informed when making design decisions which aligns with the overarching story.

Feedback is the vital conduit that links player choices to the game's narrative structure. It guides players through a complex web of interactions and it is the emphasis required to make Player Agency matter. Feedback becomes the critical medium through which narrative structures are pursued in order to deliver meaningful interactivity in a simulation. As we move forward in the ever-evolving landscape of interactive storytelling, feedback remains the cornerstone. In the grand tapestry of interactive narratives, feedback is the golden thread that weaves player agency and narrative structure into a coherent and engaging story, enriching the art of gaming storytelling.

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