

Aligning Story and Gameplay through Narrative Goals

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ABSTRACT

There is consensus that the intersection of gameplay and story is complicated. Some scholars conclude that these elements are fundamentally at odds with one another in game and narrative design. In this paper, we discuss how their relationship is symbiotic—not antagonistic—by articulating a novel nexus between story and gameplay. We term this nexus a *narrative goal*, defined as a player interpretation of a ludological goal, which in turn is a condition a player is expected to meet to succeed at the game. We articulate this nexus as part of a novel framework centered on Goals, Feedback, and Interpretation (GFI), which is useful for characterizing uniquely narrative phenomena that arises as part of a designer's effort to align story and gameplay. GFI complements the long-standing Mechanics, Dynamics, and Aesthetics (MDA) framework, and we evidence its utility by analyzing problems when trying to align story and gameplay, as well as offering perspectives on how to design them to achieve particular narrative effects. We believe that narrative goals and GFI have potential to clarify the narrative design process, and offer them as conceptual tools for researchers and practitioners to decompose, study, and design a broad class of games that are intended to elicit a sense of story.


1. Introduction

Mukherjee's (2015) *Video Games and Storytelling* (Mukherjee, 2015) begins by remarking on the peculiarities of the instructions shown to players in *Grand Theft Auto: San Andreas* (GTA, North, 2004): The player is told to "start this mission by entering the red marker at the Johnson House" and then "hop on a bicycle and follow Sweet, repeatedly tapping 'X' to build up momentum." These instructions, a communication of goals for the player to make sense of, are strange because they are simultaneously an extract from the story of Carl Johnson and a call to action in which the player is suddenly "thrown into someone else's story and [...] expected to continue the tale" (Mukherjee, 2015).

There is a duality (story and gameplay) that makes these kinds of instructions hard to understand if one is not familiar with games. Consider, for example, how does the player know what to do when the game says "hop on a bicycle"? The player knows that they must do something (press specific buttons on the controller in a certain sequence) that the game supports (as valid inputs) and that, in turn, will be interpreted by the game's internal logic as "hopping on the bicycle". We can also ask how does the game's designer know what to communicate to the player such that they (hopefully) know what to do? Would it have been more effective for the game to have communicated "using your left thumb, change the orientation of the controller's left thumb-stick such that the character called CJ moves to the location on screen that overlaps with the picture of a bicycle and then press 'X' with your right hand"? Furthermore, how can the player realize that they have not succeeded in meeting the goal to "hop on the bike" and how does the game determine the player has not succeeded? For instance, does lack of progress on the player's part elicit, from the game: a failure state (and how and when is this determined), insistent messaging repeating the goal "no, really, hop on the bike" (and when does this begin?), or something else entirely?

We argue that the answers to all of the above questions can be understood by examining the confluence of gameplay and story under a new light. As noted by Mukherjee (2015), games often communicate afforded goal(s) by referring to story and gameplay together, as in the GTA examples above. Further, when describing a game's goals, players do so by framing them in a narrative context (Ensslin, 2011). For example, it is more idiomatic for players to say "I need to go save the prince" rather than "I need to move the character I control to a specific game location." Indeed, it seems that for many games, it is a *narrative goal* that is at the forefront of how players describe the game rather than a *ludic*

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goal (Eladhari, 2018; Larsen, Bruni and Schoenau-Fog, 2019). We argue that examining *goals*, often understood as a constituent element of games (Stenros, 2017), can be fruitful for articulating, studying, and bridging the relationship between gameplay and story.

However, as we note in our questions above, these goals do not exist in isolation. Rather, they exist in a context where they need to be interpreted by the player (what do I need to press on the controller to accomplish them) and game designer (how will the game determine that a goal has been met or not?). This interpretation is mediated by feedback the player receives when they succeed or fail in meeting a goal.

In this article we present the GFI framework (for Goals, Feedback, and Interpretation) that incorporates these elements as fundamental components. This framework is complementary to the MDA framework (Hunicke, LeBlanc and Zubek, 2004) that provides a game design-centric way of understanding games. We note that our work is similar in many respects to those approaches that explore how games, and their sub-components (e.g. mechanics, procedures) produce meaning. These approaches—e.g. unit operations (Bogost, 2006), operational logics (Wardrip-Fruin and Mateas, 2009), and procedural rhetoric (Bogost, 2010)—are arguably broader in scope than what we propose and a deeper comparison of GFI to these approaches, while potentially fruitful, is outside the scope of this work.

Our framework makes evident a fundamental claim that we explain and justify throughout this paper: all games afford to be interpreted *as* stories. What licenses that interpretation is the degree to which the game in question is *representational* (Bateman, 2013). In that sense, our work applies to games whose elements successfully serve as “props in games of make-believe” (Walton, 1991) (and is thus not limited to games whose focus is narrative).

By examining the role and function of goals in games and using both GFI and MDA frameworks simultaneously we can systematically understand and answer the questions that arise when we consider the intersection of gameplay and story. Specifically, we will examine (and define) narrative goals and their relationship to ludological goals. This will allow us to better unpack many of the problems that have been pointed out by scholars around how story and gameplay align (or not).

2. Related Work and the Many Senses of Narrative Goals

To bridge the gap between narrative and gameplay, we will introduce a model that builds upon previous work. In this section we review prior attempts to connect narrative and gameplay, focusing on two broad efforts: (1) *Quest Theory* (Aarseth, 2005), which argues for *quests* as the connection between narrative and gameplay, and (2) prior work that has used the term “narrative goals” to denote different ways that narrative and gameplay can come together.

2.1. Quest Theory

Research in the early years of game studies identified quests as a potential nexus point between narrative and games (Aarseth, 2005; Tosca, 2003; Tronsted, 2001). These scholars’ discussions of quests generally focus on their definition, types, and function in games. Since in-depth examination of the origin of the term (e.g. from the epic quest to tabletop role playing games (Tosca, 2003)) is beyond this paper’s scope, we will only focus on a few definitions we found productive for our purposes. Tosca defined quests as bringing

[...] some or all the storytelling elements (characters, plot, causality, world) together with the interaction, so that we can define it as the array of soft rules [particular rules that guide player behavior as opposed to hard rules which are general and world building] that describe what the player has to do in a particular storytelling situation.

(Tosca, 2003)

In other words, for Tosca, a quest combines storytelling elements and rules that describe what the player’s goal is in a storytelling situation. Aarseth, however, points out that this definition is rather narrow and not applicable to particular games—such as *Hunt the Wumpus* (Yob, 1973). Therefore he defines quest games as those:

[...] with a concrete and attainable goal, which supersedes performance or the accumulation of points. Such goals can be nested (hierarchical), concurrent, or serial, or a combination of the above.

(Aarseth, 2005)

And lastly, according to Howard

[a] quest is a journey across a symbolic, fantastic landscape in which a protagonist or player collects objects and talks to characters in order to overcome challenges and achieve a *meaningful goal*.

(Howard, 2008, p. xi, emphasis added)

We note that while Tosca and Howard define *quests*, Aarseth defines *quest games* with the former being a sub-element of the latter. However, Tosca points out that quests “tell the player what to do,” Aarseth specifically refers to concrete goals as constitutional elements of quest games, and Howard adds the meaningfulness of the task. Synthesizing these perspectives, quests would be concrete attainable goals that tell the player what to do via storytelling elements in a game, which have some meaning transcending the accumulation of points. This is an essential observation, considering our GFI model uses ludological goals that direct player behavior within the mechanical system of a game (what to do), and narrative goals which indicate to the player a particular meaning of this goal (why they do it).

Additionally, Aarseth describes “basic quest types and combinations” (Aarseth, 2005, p. 497). According to him, game quests are essentially about *time*, *place*, and *objective* and combinations of these. A famous quest encompassing all three types leads players of *World of Warcraft* (Blizzard Entertainment, 2004) from The Barrens to Thunderbluff in Mulgore (place) to deliver medicine for an apothecary (objective). This must be done within a particular time frame: before the medicine turns bad (time). After introduction of our model, it will become clear that this quest contains combinations of *what* to do (reach a location) and *why* you do it (help the apothecary and his associate). More generally, this early classification of quests hints at the deeper interconnection of ludic and narrative aspects of goals in games. This, as the quest literature suggests, is the essential function of quests in games. For example, consider Tosca’s description of what quests do in games:

In computer games, quests incarnate causality at two levels: a semantic one, where we understand how/why actions are connected (the character has to do X because of Y, and then Z will happen); and a structural one (the designer can plan for the events and objects involved in the quest, and also for the order in which some or all events must take place).

(Tosca, 2003)

We agree that the essential function of quests (and narrative goals) is to tie a particular ludological goal (player controlled character must reach a location) with its meaningful (narrative) counterpart (go to Thunderbluff). However, Tosca’s description stays at a surface level of the problem that we want to solve. While her description of the semantic (narrative) level of a quest accurately identifies the communication of *why*, her description of the structural level remains both narrative and topological. The “events and objects involved in the quest” are part of the narrative, as per narrative theory (cf. Aarseth, 2012). Furthermore, the “order in which some or all events must take place” is either the narrative’s plot, or the quest topology (e.g. quests can have a series of objectives that must be done in a certain order). What is lacking is the dive into what exactly the quest’s nature is on the structural gameplay level and how this is connected to the narrative elements. What is a player required to do below the narrative label of “bring the medicine to Thunderbluff” or “get on the bike”? Also, how does the designer assure the narrative label effectively conveys the desired instructions of “move your character to a particular, distant in-game location”? These questions indicate an essential assumption and observation we will address in our GFI model: the same *gameplay acts* can be communicated differently, to produce particular meanings and interpretations.

We propose that “narrative goals”, as a concept, can account both for the nature of guiding narrative structures in games, and also their underlying gameplay.

2.2. The Many Senses of Narrative Goals

We argue that narrative goals are a promising bridge between story and gameplay. However, we are not the first to use, or define the term. Therefore, we will now review some common uses of “narrative goal” to illustrate where these fall short of describing what we mean, and thereby pave the way toward a definition that disambiguates our intent.

2.2.1. Preliminary Definitions

In talking about narrative, we are implicitly making an ontological commitment over its structure and phenomenology. To avoid leaving this tacit, here we briefly outline our narratological assumptions. A *narrative* or *story* is a communicative, designed artifact: it is the product of a *narration*. A narration is a surface-level realization (e.g. book, comic, film, game) of the *discourse* (Hühn and Sommer, 2013). The discourse is the story’s information-layer: an

author-structured, temporally-organized subset of the *plot*; the discourse is thus a projection of the plot's information (Genette, 1980). The plot is the narrative's world (Chatman, 1980; Rimmon-Kenan, 2002), including its characters (anthropomorphized intention-driven agents), locations (the spatial context), and events (causally, purposively, and chronologically related changes in states of affairs).

Similarly, it is worth briefly describing what we mean by *goal* in the context of games. To us, a goal is a *meaningful* game condition that players can meet. What gives rise to that meaning depends on the kind of goal, and we will return to this point later on.

2.2.2. Narrative Goals as Authorial Goals

Here, “narrative goal” refers to a goal a designer has for the unfolding of a game. In that light, the *authorial* “narrative” goal is the maximal maintenance or preservation of the author's intended experience. Authorial goals have been discussed in at least two ways: preserving the author's plot and preserving a narrative's experiential goals.

The former refers to the preservation of a prescribed collection of plot *beats*, themselves the smallest unit of dramatic action as discussed in theories of dramatic screenwriting (McKee, 1997). This presumes that there is some plot the author of the game wishes to achieve, and the player is afforded the opportunity to fulfill some dramatic role in the unfolding plot. Preservation can be effected via the game's design, *e.g.* by “scripting the interactor” as they fulfill their afforded role in the story (Murray, 2017, p. 79). It may also be effected by some in-game artificial intelligence (AI) agent orchestrating the experience (El-Nasr, 2007; Riedl and Bulitko, 2013; Robertson, Cardona-Rivera and Young, 2020), which is responsible for monitoring and manipulating the unfolding game to satisfy an input set of authorial goals. For example, in *Façade*:

...a [beat is] organized around a common *narrative goal*, such as a brief conflict about a topic, like Grace's obsession with redecorating, or the revelation of an important secret, like Trip's attempt to force Grace to enjoy their second honeymoon in Italy.

Mateas and Stern (2007, p. 191, emphasis added)

The *drama manager* AI in *Façade* monitors players and orchestrates the non-player characters Trip and Grace in order to evolve the narrative toward beats it thinks would be interesting for the player to experience (Mateas and Stern, 2005).

In the second use of narrative goals as authorial goals we find that instead of a pre-specified narrative, the authorial goal is cast as the designer's intent for the player to experience situations that formally share some property but which may materially manifest in different ways. For example, an experiential goal can be centered on player *sensemaking*: “In ‘closed/thick’ [alternate reality games], the *narrative goal* is a collective re-construction of the macro-story, driven by individual player interpretations (micro-stories) of distributed transmedia fragments.” (Bonsignore, Moulder, Neustaedter, Hansen, Kraus and Druin, 2014, p. 948, emphasis added). As another example, an experiential goal can be centered on player *pacing*:

In interactive media, the designers can choose to give the interactor control over camera point of view... Can the timing and the presentation of this interactor control over camera point of view be designed in such a way that this very exercise of interactor choice (not just its outcomes) reflects a *narrative goal*? For example, can the degrees of freedom of such a choice be modulated as a function of player progress or accumulated power within a game experience while simultaneously acting to accentuate the story?

Bizzocchi and Woodbury (2003, p. 564, emphasis added).

2.2.3. Narrative Goals as Character Goals

A second sense of “narrative goal” is when it denotes a goal a character may have that prompts them into action, thus propelling the narrative forward. Goal reasoning—the choice of which goals to adopt, maintain, or drop, and how to pursue them (Vattam, Klenk, Molineaux and Aha, 2013)—contributes to defining characters in story worlds (Lebowitz, 1984). For example, a character's personality can be effectively identified by their choice of goal, plan for achievement, and response to plan outcome (Bahamón, Barot and Young, 2015; Amos-Binks and Young, 2018). In fact, the practice of storygame writing has recommended designing characters from clusters of traits realized via goal formulation and problem-solving styles (Laurel, 2013). Normatively, we:

...should strive to make characters in a simulated environment as interesting and believable as the characters in great traditional stories. Every great character has his own goals and sees in the process of obtaining them his own payoffs, successes, failures, and revelations.

Character goals have been discussed in at least three ways: as expectations of player activity, as structuring behavior of non-player characters, and as cognitive "anchors."

Presuming a player controls a character in the story world, the player also constitutes a distinguished plot character. Thus, the character goals in question are the goals that the player should have in the context of the game, whether adopted within it or imposed by it. This kind of goal thus contextualizes the player's activity; for example, "Path Movement is the general *narrative goal* or purpose for the player to continue through a mission/quest." (Milam and El Nasr, 2010, p. 140, emphasis added). In this sense, character goals direct player behavior towards pre-defined expectations.

Similarly, character goals can structure not player, but *non-player* character behavior (e.g. the *Versu* system by Evans and Short, 2013). Here, the narrative goal is a goal for an agent which results in making them more believable as characters. This in turn contributes to the narrative's coherence:

Short-term narratives are implemented as high level behavior goals, each goal having multiple possible plans that can be executed in a non-linear order. *Narrative goals* are often spawned as reactions to user interaction, to other events in the environment, or to the character's own internal metabolism.

Stern (1999, p. 50, emphasis added)

This rationale reflects that for the sake of maintaining an audience's *willing suspension of disbelief* (Holland, 2003), characters must act intentionally to be believable (Dennett, 1989; Bates et al., 1994).

Finally, unresolved narrative goals drive our continued attention to the unfolding plot and serve as cognitive "anchors." As readers routinely track (and better remember) unfulfilled character goals in stories, these earn a privileged place in our cognition (Singer and Richards, 2005).

2.2.4. Narrative Goals as Player Goals

A third sense of "narrative goal" refers to *player goals*, those that players bring to the game that are not necessarily considered or recognized by the game's creators (Björk and Holopainen, 2005), e.g. speedrunning (Scully-Blaker, 2014) or role-play (Deterding and Zagal, 2018). That is, a player's "narrative goal" shapes the resulting narrative that unfolds in response to their gameplay. These player goals have themselves been discussed in at least two ways.

The first way is similar to the notion of a reader's goal when engaging with a text (Zwaan, 1994). These goals emerge from the goal of playing in a certain style that results in a satisfying traversal of a game experience "on narrative terms" (Mitchell and McGee, 2009, p. 100). For example "the Nordic larp tradition has a technique called playing to lose where players volunteer to make their characters fail in their goals in order to create more interesting stories" (Björk and Zagal, 2018). Similarly, As Mitchell and McGee (2009, p. 102) note, in these games: "Each narrative move should not only advance a player relative to the other players, it should clearly advance the player towards winning the game in terms of a *narrative goal*" (emphasis added). An example narrative goal might be "create the best story," where "best" is voted upon by all players. Traversing a game in a "narratively satisfying" way might also be incentivized by the game itself (Wallis, 2007). In *Pantheon and other Roleplaying Games* (Laws, 2000), players tell stories given an initial setup and, after everyone is done constructing the story, they are each awarded points for how many genre tropes they hit. In other cases, "narratively satisfying" traversals might simply be afforded, as in *The Sims* (Maxis, 2000), wherein it is up to the player to coax a good story out of the simulation. As Ryan (2009, p.46–47) notes:

Playable stories induce a much more aesthetic pleasure than games because the player is not narrowly focused on goals. For me the essence of the playable story is captured by what I once heard a little girl say about the game *The Sims*: "Guess what I managed to do with my Sims? I made the father and mother drown in the pool, and now the kids are alone in the house and they can do whatever they want." For this little girl, the pleasure of the game did not come from reaching a state defined by rules, but in coaxing a good story out of the system.

The second way focuses on a player's desire to have certain story experiences, as opposed to enacting stories in a certain way. While we have not found this kind of player goal referred to as a "narrative goal," it has been described in a manner that is intertwined with narrative contexts. Specifically:

In a narrativized game the player pursues the kind of goals that people may form in everyday life or in their fantasies: goals such as saving the world from invaders and rescuing people in danger, if you want to be a good guy, or stealing cars and killing people, if you prefer villainous roles.

Ryan (2009, p. 46)

2.3. Reconciling the Different Senses of Narrative Goals: Toward a New Definition

The different senses discussed so far reflect the broadest view of what narrative goals *could* be. In context these definitions all make tacit sense as to why they are referred to as *narrative* goals: they are goal-like structures that have *something* to do with narrative. However, this discussion also highlights a tension worth resolving: as a term, *narrative goal* is polysemic. Further, its use in the literature is wide-reaching. For some scholars, the term implies that we are talking about a *storygame* as defined by Reed (2017, p. 17): a game with narrative elements where the understanding of both story elements and game elements and the relationship between them is required for a *satisfying traversal*—wherein both player and storygame author broadly agree that the game was encountered as intended and need not be replayed. In other contexts, the term is used as an author-desired constraint over the *gamestory*—the *result* of the player's influence on the trajectory of events that constitute the plot—or over the *afterstory* (Larsen et al., 2019)—the player's subjective experience of the gamestory. Moreover, we see an underlying disagreement between narrative goals as pre-scripted into the game, or created by/brought to the game by the players. Finally, some scholars discuss it as relevant to games writ large, not just storygames.

How might we reconcile all these different senses? How are these senses related? We present answers to these questions in the next section. To anticipate: we view a *narrative goal* as a player *interpretation* of a corresponding *ludological goal*, and the different senses discussed in the literature can be subsumed by our definition. In order to arrive at our definition, we need to be more precise about these concepts. For this, we re-introduce a conceptual framework we have outlined previously—GFI (standing for *Goals, Feedback, and Interpretation*), developed originally to address the shortcomings of the *Mechanics, Dynamics, Aesthetics* or MDA framework (Hunicke et al., 2004) for modeling *narrative* phenomena in the context of games (Cardona-Rivera, Zagal and Debus, 2020a).

3. Theoretical Backdrop: The *Goals, Feedback, and Interpretation* Framework

The GFI framework is a general conceptual tool for game design and game analysis that distinguishes three design components of games: goals, feedback, and interpretation. These components are useful for addressing shortcomings in the dominant conceptual tool for games: the MDA framework, which itself distinguishes three components orthogonal to GFI—namely, mechanics, dynamics, and aesthetics (Hunicke et al., 2004). As MDA plays a central role in the introduction of our model, we briefly summarize it below. We then briefly present our rationale for how GFI is different from MDA, complementary to MDA, and necessary to account for story-focused elements in games. We conclude the section by explicating GFI in full detail, including how it subsumes related work in the previous section.

3.1. Basis: The *Mechanics, Dynamics, and Aesthetics* Framework

Hunicke et al. (2004) describe computer games as complex systems which afford interaction resulting in complex, dynamic, and unpredictable behavior. They emphasize that “the difference between games and other entertainment product[s] [...] is that their consumption is relatively *unpredictable*,” meaning that “[t]he string of events that occur during gameplay and the outcome of those events are unknown at the time the product is finished.” This poses a challenge for designers, analysts, and scholars that MDA aims to help with.

3.1.1. What MDA Offers

MDA provides a framework to enable more directed design for (or analysis of) games by proposing that they can be decomposed into three layers: (1) Mechanics, “the components of the game at the level of data representation and algorithms” that reflect the rules, (2) Dynamics, “the run-time behavior of the mechanics acting on player inputs and each others’ outputs over time” that reflects the system, and (3) Aesthetics, “the desirable emotional responses evoked in the player, when she interacts with the game system” that reflect the “fun.”

They exemplify the use of their model at hand of a too familiar example: multiple hours of Monopoly just to finish a game that was decided long before its official conclusion. The authors argue that this is not “fun,” due to a lack of challenge or tension (*Aesthetics*), which are the result of a particular *Dynamic* that evolves during play: the stronger (rich) players get stronger, and the weak (poor) players get poorer. Following MDA, this *Dynamic* results from a lack

of *Mechanics* that enable players to catch-up when behind. To “fix Monopoly” they propose mechanics such as taxes for rich players, or subsidies for players who are lagging behind. Putting such taxation *Mechanics* into play would mitigate the scissor *Dynamic* that leads to a poor *Aesthetic* experience.

3.1.2. How MDA Falls Short in Describing Story and Gameplay Alignment

As we have described in prior work (Cardona-Rivera et al., 2020a), current works that conceptually describe the alignment between story and gameplay can be cast as story-specific accounts of MDA. Aarseth (2012), for example, describes a story-centered model of mechanics. Similarly, Koenitz (2010) describes a story-centered model of dynamics. Akin to these, Punday (2004) describes a story-centered model of aesthetics.

However, while it has proven popular and useful for game design and analysis, the MDA framework has also been critiqued for not including or providing a way to account for the narrative elements of games in a plain manner (Winn, 2009; Dormans et al., 2012; Silva and Zaffari, 2017). As Walk, Görlich and Barrett (2017, p. 30) argue, MDA “fails to provide a framework or even a coherent approach for narrative design.” Further, as Dena (2017, p. 33) argues, the direct use of MDA for narrative design leads to a misalignment of story and gameplay because narrative is framed as distinct from (and in the worst case positioned as a “wrapper” around (Dansky, 2014)) the game.

In light of the above, MDA—by itself—cannot connect story and gameplay. In unpacking why that is, we distilled the following reasons:

1. Mechanics describe how one can act, not why one would want to.
2. Dynamics describe what results from player interaction, not how to elicit interaction in the first place.
3. Aesthetics tells you what people feel, not what leads to it.

The above aspects that are left unexplained by MDA are critical to decomposing the narrative quality of games. Our rationale for introducing GFI was precisely to fill in these gaps. In GFI, *Goals* (§3.2.1) models player motivations and intentions, which are key for ludic (Gaver, 2002) and narrative engagement (Bates et al., 1994; Murray, 2011). Further, players come to understand how to interact in games due in large part to the tight-coupling of actions to the perceivable features of virtual environments (Linderoth, 2013). In GFI, *Feedback* (§3.2.2) models these features, critical to structuring the player’s activity. Finally, evoked emotions arise from what players think about, which presupposes an *Interpretation* (§3.2.3) of their experience (Currie, 2004). Thus, the GFI framework (Figure 1) formalizes the distinct design components of games that are not well-covered by MDA.

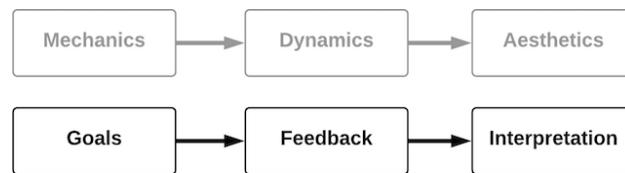


Figure 1: GFI, complementary and parallel-to-MDA framework. Goals & Mechanics suggest Feedback that designers should offer players to structure the Dynamics, which elicits *particular* Interpretations that contribute to an emergent Aesthetic experience.

We note that GFI is not an extension or replacement for MDA. Rather, we see it as parallel—but complementary—to MDA’s “[...]formal approach to understanding games - one which attempts to bridge the gap between game design and development, game criticism, and technical game research.”

3.2. What GFI Offers

GFI constitutes a formal approach to design and analyze the relationship of a game’s underlying mechanical systems via its ludic *Goals*, and the players’ *Interpretation* of these, communicated via *Feedback*.

3.2.1. Goals

As mentioned, **goals** are meaningful game conditions that players can meet. They are widely regarded as structurally key to games (Stenros, 2017). We focus on two broad senses of them, purposefully excluding *player-defined* ones—that players bring to a game and are not necessarily considered by the game’s creators (Björk and Holopainen, 2005), e.g. *speed-running* (Scully-Blaker, 2014)—as out of scope. *Ludological goals* are conditions players are expected to meet to succeed at a game, as these are codified and recognized in-game (Debus, Zagal and Cardona-Rivera, 2020). *Narrative goals* are player-interpretations of ludological ones. (Cardona-Rivera, Zagal and Debus, 2020b).

Table 1

Ultimate goals: overarching conditions that determine a game's end (Zagal et al., 2019).

Ultimate	Description ("Games with this ultimate goal...")
<i>Win</i>	Effect an evaluation when a predefined state is reached.
<i>Finish</i>	Effect <i>no</i> evaluation when a predefined state is reached.
<i>Prolong</i>	Conclude against the designer or player's intent.

Existing scholarship has articulated how goals manifest and how different kinds of goals are related to each other (Smith et al., 2006; Juul, 2007; Elverdam and Aarseth, 2007; Leino, 2010). Of this literature, the most relevant scholarship is that by Costikyan (2002), who argues for the distinction between *explicit* v. *implicit* goals: the former are communicated to players directly and the latter must be inferred from non-obvious cues. While one may argue that this is a merely "epistemic" distinction (Debus, 2019), we note that the "explicitness" of a goal is helped or hindered via feedback and that this is critical to narrative goals (see §3.2.2). When we use the term *goals*, we are referring to *both* senses. We discuss their ludological sense next and their narrative sense in §3.2.3.

There are two kinds of ludological goals. All games have **ultimate goals** that determine their end conditions (Zagal, Debus and Cardona-Rivera, 2019). There are at least three (summarized in Table 1): *Win*, *Finish*, and *Prolong* (the act of playing). Games whose ultimate goal is *to win* are those where an evaluation or assessment occurs when the game concludes. Most sports and boardgames have this goal, similar to many competitive games. Colloquially, you win in Chess and Soccer. Games whose ultimate goal is *to finish* are those with pre-designed/-determined conclusion(s), but which do not have an explicit assessment when they conclude. This is commonly seen in storygame and storygame-like experiences that one might "complete" or "reach the ending" for. Colloquially, you finish *Super Mario Bros.* (Nintendo Creative Department, 1985, SMB) and *Myst* (Cyan, 1993). Games whose ultimate goal is *to prolong* are ones that "ideally" never conclude. Some of these games conclude against the player's intent: here, players "lose" when the game ends. This is qualitatively different to *winning* or *finishing* in that it refers to the negation of a fail state; e.g. the player must "not die." Colloquially, you prolong play by surviving in *DayZ* (Bohemia Interactive, 2018) and *Space Invaders* (Taito, 1978). Other games with this ultimate goal conclude against the designer's intent: here, designers "lose" when the player stops playing (e.g. MMOs and games as a service).

Achieving a game's ultimate goal requires satisfying the *proximate* (Smith et al., 2006) or **imperative goals** (Debus et al., 2020) that it necessarily decomposes into, whose accomplishment entails the ultimate's. Imperative goals more-concretely require the player to achieve a particular game state of affairs codified in the game itself. We have described these imperatives at length elsewhere (Debus et al., 2020), but re-state the critical elements for the completeness of this discussion. There are at least ten types of imperatives (summarized in Table 2). An imperative links game elements such as space, time, and entities (Debus, 2019). Players may be asked to: (1) *Choose*, or select an element from a set, as with options within dialogue trees; (2) *Configure*, or manipulate elements until they are in a correct state, as with unsolved puzzles; (3) *Create*, or bring an element into existence that did not exist before, as in crafting games; (4) *Find*, or locate an element in a spatial context, as in scavenger hunts; (5) *Obtain*, or place an element under their control, as in "capture the flag"; (6) *Optimize*, or accumulate a requested amount of a particular element, e.g. your standing in a racing game; (7) *Reach*, or navigate through space toward a particular location, as in platformer games; (8) *Remove*, or eliminate an element from existence, as when you defeat enemies in games; (9) *Solve*, which is akin to *Choose* but where the set of elements to select from is large and there *is* a "correct" element, as in social deception games; and finally (10) *Synchronize*, or bring together/unify one or more elements in space and/or time, as in dancing games. Each imperative has a logical dual: its *prevention*.

Imperatives may decompose into more-specific others, creating a *Ludological Goal Hierarchy* (Cardona-Rivera et al., 2020b). The hierarchy's base maps onto a moment in gameplay. Figures 2 and 3 illustrate this idea: to *Finish SMB*, one must *Remove* the agent depicted as Bowser. To do so, one must *Reach* the location depicted as the axe. To do so, (in Figure 2's state) one might want to *Prevent* spatiotemporally *Synchronizing* with the object depicted as a fireball. To do so, one might need to *Reach* the location depicted as a platform. And so on. Analytically identifying a game's full hierarchy is challenging, since it must encompass all ludological goals a player may face in all possible playthroughs. However, ludological goals (and their hierarchy) are under the direct control of a designer who specifies what conditions "count" to satisfy the ludological goals.

Our use of the dyad "depicted as" is intentional: Bowser, the axe, the fireball, and the platform are *representational*

Table 2

Imperative goals: closer-to-gameplay conditions necessary to achieve a game's ultimate goal (Debus et al., 2020).

Imperative	Description ("This imperative requires players to...")
<i>Choose</i>	Select one element from a finite set of elements.
<i>Configure</i>	Manipulate elements such that they are in a "correct" state.
<i>Create</i>	Bring an element into existence that was not before.
<i>Find</i>	Locate a particular element.
<i>Obtain</i>	Bring a particular element under control.
<i>Optimize</i>	Accumulate a requested amount of a particular element.
<i>Reach</i>	Navigate to a particular location.
<i>Remove</i>	Eliminate an element from existence that existed before.
<i>Solve</i>	Select one "correct" element from an infinite set of elements.
<i>Synchronize</i>	Bring one or more elements into spatial/temporal unity.

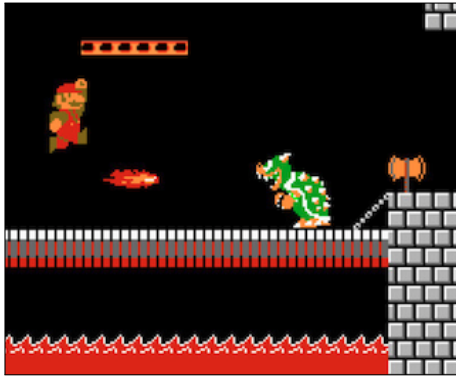


Figure 2: *Finish SMB* requires *Remove*-Bowser, which may be accomplished via the more-specific imperative *Reach*-Axe, that is closer to the needed gameplay.

Ludological Goal Hierarchy

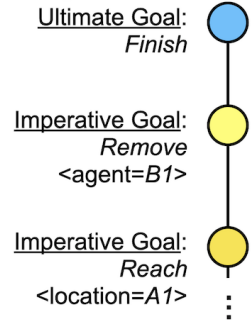


Figure 3: A Ludological Goal Hierarchy for the scene in Figure 2. Goals are written with software-like variables (*i.e.* B1, A1) to emphasize their in-game computational model.

game elements (Bateman, 2013). In effect, this means that their depiction on screen is independent of their underlying *computational model* (Cardona-Rivera, 2020). At a computational level, game elements *exist* in terms of the data structures that represent them and the algorithms that manipulate them.¹ For instance, whereas players might recognize Bowser as a character to *Remove*, the game's software may represent Bowser as an array of connected pixels or (more commonly) as a *bounding box*—a rectangular area of space that contains a “solid” entity (Millington, 2007). How players come to understand what the codified elements mean in order to know what to do is a critical part of the narrative design process. In the next section, we discuss how careful construction of feedback is required such that goals are *communicated* to the player in order to motivate their activity.

3.2.2. Feedback

Feedback is the designed multi-modal stimuli intended to convey perceptual information about the game's structural elements: its underlying ends (goals) and the available means to achieve them (mechanics). This may include things such as graphics, music, sound, text, and more. Crafting feedback is arguably a narrative designer's most critical responsibility, and is what makes the practice of narrative design relevant to all but the most abstract games, including ones that do not necessarily place a primacy on narrative. Narrative designer Richard Dansky argues that people only think of *explicitly denoted* narrative elements as *the game's narrative*. However:

There's also implicit narrative built into every game though the choice of setting, items, character design - the assets of the game tell a story, if only by their very existence. Or, to put it another way, think about the archetypal tool you get in *Minecraft*. It's a pickaxe. It's not a tricorder. It's not a Black and Decker multi-tool. It's a pickaxe, and through its very pickaxe-ness - low tech, implied manual labor, etc. - it tells part

¹One might be tempted to conclude that this analysis is only applicable to software games. However, we posit that analog games have a *tacit* computational model governing their operation, as others have argued (*e.g.* Zimmerman, 2004).

Table 3

Typology of feedback available for narrative design.

Feedback	Examples ("Feedback of this type includes...")
<i>Phonological</i>	Textual symbols, lines, shapes, haptics, sounds, lights, colors.
<i>Lexical</i>	Words, images, vibration patterns, voices, music notes, sound effects.
<i>Grammatical</i>	Texts, image sequences, camera shots, dialogue, music.
<i>Denotational</i>	Description, exposition, narration, characterization.

of the story of the world it exists in. Ditto for those towers in tower defense games that everyone claims come narrative free - they're shaped like *something*, they're shooting *something*, and those choices frame a story before word one of any dialog or plot gets written. If you're shooting aliens in a tower defense game, you've established genre (science fiction) and technology (aliens with enough tech to invade, you with enough tech to fight back); your backdrop implies the course of the conflict so far, and so on. As soon as you decide what a game asset is, you're implying the narrative that allows it to exist and function.

Dansky (2014)

One way to conceptually model feedback is via a four-element typology of feedback: phonological, lexical, grammatical, and denotational (Table 3). This typology is inspired by linguistics (Cohn, 2019)² and parallels the tripartite model of narrative discussed in §2: the story, the discourse, and the narration. *Phonological feedback* is at the level of narration: the sounds, signs, and haptics that can be structured to convey meaning. *Lexical feedback* is at a higher-level of meaning within narration: a language inventory of the smallest units of meaning. In *SMB*, a specific arrangement of colored pixels (phonological feedback) contribute to Figure 2's depiction of the image of the axe, which is lexical. *Grammatical feedback* is at the level of discourse: stimuli structured according to a corresponding syntax. Adherence to that syntax facilitates story sensemaking (Cardona-Rivera and Young, 2019) and licenses inferences about underlying meaning. In *SMB*, image sequences are structured from left-to-right, which Grammatically suggests that the player progresses by going right-ward, potentially giving a clue on how to defeat Bowser for players who have never faced the King Koopa before. Finally, *denotational feedback* is at the level of story: it includes stimuli that communicates the plot's event structure, and it most-closely matches the discussed sense of "explicit narrative." Figure 4 depicts exposition that is denotational: it signals to the player that their gameplay has concluded.



Figure 4: The *Denotational Feedback* at the end of *SMB* is exposition meant to elicit the player's interpretation of its ultimate goal *To Finish* as "Save the princess."

The content of Figure 4's feedback reinforces a particular interpretation of the player's activity. This interpretation and the process that gives rise to it is the last element of GFI, which we discuss next.

²Phonological and lexical feedback correspond to Cohn's "Visual Form," grammatical feedback corresponds to Cohn's "Visual Syntax," and denotational feedback corresponds to Cohn's "Visual Semantics."

3.2.3. Interpretation

Interpretation is both: (a) the situated *process* of deriving meaning from enaction (Shapiro, 2019), and (b) the *outcome* of that process. When discussing interpretation in games, what is usually meant is the outcome of the player's game experience. We typically want to answer: what is *the* narrative of a game?

Is it the space of *potential* narratives (Koenitz, 2010) the system affords? And what of games *about* story creation (Kreminski, 2019)? In describing the interpretations of a game, we want to move away from false dichotomies like *ludology* v. *narratology* (Eskelinen, 2001; Frasca, 2003; Murray, 2005) toward a more nuanced understanding of how these mutually inform and constrain each other. For narrative design, we propose that it is important to shift the discussion from the *outcome* of a player's interpretation, to the *process* that gives rise to the outcome. This process is what crystallizes the defining function of **narrative design**: structuring feedback relative to mechanics and goals aimed at guiding a player's *existing* interpretation of the game's narrative into a *preferred* interpretation (cf. Simon, 1996). In this definition, the narrative designer (or whomever they represent) is who prefers the interpretation. Further, "structuring" is broad: narrative design *may* encompass changes to mechanics and goals, so long as these are intended to effect changes to the interpretation that players may derive.

When discussing goals, we presented two typologies to conceptually model ludological ones: imperatives and ultimates. Similarly, when discussing feedback, we presented a typology to conceptually model different kinds: phonological, lexical, grammatical, and denotational. We have discussed what, to us, interpretation *is*: the assignment of meaning to ludological goals, *i.e.* narrative goals. What remains is to conceptually model it, which we offer in two parts: conceptually modeling interpretation as a *process* and as an *outcome*.

Dena (2017) offers one way to conceptually model interpretation as a process: the *Sequence Method* (Landau, 2013), which is an established method for television (TV) series narrative design. This method models the player's interpretation as a *reader-response process* (Iser, 1980), driven by unanswered-questions, with an (eventual) *outcome* of answers, possibly inciting curiosity and anticipation (Dena, 2017, p.43):

[The Sequence Method] divides the experience into a series of questions for the audience [...] the overall question introduced at the beginning and answered near the end, and [...] multiple short-term questions to keep driving the audience's interest. "[when] answered, the [TV] series is forced to either introduce new central questions or end."

Landau (2013, *op. cit.*)

This method has been endorsed by several narrative designers within the games industry. Bryant and Giglio (2015), who have designed for both movies and games, argue that the method is useful to structure objectives for level design. Further, Bernstein (2013), who has designed for movies, games, and television, argues that this method works better than the 3-Act Structure (Field, 2005) *because* it is objective-driven ("What's going to happen *next*?") and fits well within gameplay loops.

To conceptually model interpretation as an outcome we present four kinds of interpretation goals, akin to the eight kinds of aesthetic goals discussed in MDA (Hunicke et al., 2004); these are summarized in Table 4. The aesthetic goals in MDA center on desires for how people should *feel* as part of interacting with a game. In contrast, the interpretation goals in GFI center on desires for what people should *think*. This is motivated by our desire to cleanly separate the scope of design concerns. We have synthesized this typology through an inductive analysis of a close-reading of the different senses of narrative goals discussed in §2 relative to the elements of rhetoric (Johnson-Sheehan and Paine, 2012), narrative psychology (Herman, 2013), and design (Norman, 2002), and framed by the view of *language as action* as applied to games (Cardona-Rivera and Young, 2014).

Mental model-building is the desire to get players to understand how a virtual world (or some facet of it) works, in enough detail that they can mentally simulate it. In *SMB*, players develop mental models about how Goombas and Mushrooms operate as game elements; interestingly, the same tagline "Do you have what it takes to save the Mushroom Princess?" might suggest that things that do not look like mushrooms or princesses are bad for you. *Event model-building* is the desire to get players to understand a situation has happened or could happen, with particular characters, items, spatiotemporal context, and causal structure. This includes situations that happen *to* the player (like when Toad communicates that the Princess is in another castle) or situations that invite the player to act (like how the game does not advance until Bowser is defeated). *Opinion-building* is the desire to get players to develop a perspective *about* something, which can be subtle in how the game simulates some aspect within its virtual world, like character relationships, gender expression, and morality (Martens and Smith, 2020), or overt in how the simulation is

Table 4

Typology of interpretation outcomes for narrative design.

Interpretation Outcomes	Description ("This outcome is about getting players to...")
<i>Mental model-building</i>	Mentally simulate a real or possible world.
<i>Event model-building</i>	Mentally represent a real or possible episode relative to a viewpoint.
<i>Opinion-building</i>	Develop a perspective <i>about</i> something.
<i>Inference-building</i>	Develop a hypothesis about something not overtly communicated.

communicated to the player as with *procedural rhetoric* (Bogost, 2010). Lastly, *inference-building* is the desire to get players to develop hypotheses about something that is not overtly stated. This is intimately linked to managing player expectations, which as we detail later, are a core concern of narrative design. Mental model-/Event Model-building are broadly under the rhetorical aim "to inform" the player, whereas opinion-/inference-building are broadly under the rhetorical aim "to persuade" the player.

3.3. Narrative Goals, Revisited

Because interpretation is both a process and outcome, we revisit our discussion of narrative goals to more-precisely state what they are. A **narrative goal** is an interpretation *outcome* from a ludological (ultimate or imperative) goal. This kind of interpretation can be formalized as done in the study of logics: an interpretation is a formal assignment of *meaning* to the symbols of some formal language. Here, the set of possible symbols is the set of possible ludological goals. Thus, a narrative goal is itself a ludological goal with some meaning "assigned" to it. It limits but also reflects the meaning that players derive from what they are tasked to do. How meaning emerges and is assigned to a particular ludological goal so that a *narrative* goal emerges is a central concern of the psychology of play (Hodent, 2017). How that meaning-making process might be supported so that the ludological goal gives rise to a *particular* narrative goal is a key part of the challenge that narrative designers face.

To avoid a vacuous definition, we briefly discuss one way in which we can arrive at a crisp notion of what meaning itself *is*: meaning is the product of *enaction*. Here, we assume that the concepts with which we ascribe meaning are cognitively-grounded in *situated action*, a central tenet of embodied cognition (Shapiro, 2019). The meanings of things are acquired as a result of our activity in the world, and can later be recovered in (for example) our use of metaphor (Lakoff and Johnson, 2008). Both the activity and the environment itself are key, in the real world and in the virtual ones we experience. However, for meaning to *hold*, activity must be purposeful: "Enactment requires active, *goal-driven effort*, often in the form of balancing long-term and short-term goals." (Howard, 2008, p. 1, emphasis added). Meaning thus emerges from two things: the player's actions in pursuit of the underlying ludological goal and the feedback (*i.e.* multi-modal stimuli) that the player receives from the game (*e.g.* text presented, images, sound, interface elements, *etc.*). We mean to be inclusive with player actions: meaning is subject to *choice* (Mawhorter, Zegura, Gray, Jhala, Mateas and Wardrip-Fruin, 2018) and so it encompasses what was done and what was *not* done—in the sense of actions not taken (Nay and Zagal, 2017) and/or inaction (Zagal, 2011).

3.4. Narrative Goals, Reconciled

We now return to the questions posed at the end of §2.3, summarized as: when we talk about narrative goals in the literature, what do we really mean? Our definition is broad and means to capture all the senses we have discussed. We see this as necessary: if we want to effectively align gameplay and story, we cannot ignore the critical connections already articulated in the literature. We begin by briefly describing the **Parallel Goal Hierarchies** (Cardona-Rivera et al., 2020b) as illustrated in Figure 5. This will be necessary to subsequently compare our definition of narrative goals to the concepts and definitions described in section §2.2.

When using the parallel hierarchies in analysis, the *Ludological* side reflects the sub-ordinate (imperative) goals needed to *satisfy* super-ordinate (imperative or ultimate) goals, obtained through successive *decomposition* (Beaney, 2005); *i.e.* each new sub-ordinate goal is obtained from a given one by asking (and explaining) "how does one achieve the given goal?" In tandem, the *Narrative* side reflects the super-ordinate goals that *motivate* the sub-ordinate goals, obtained through successive *regression* (Beaney, 2005); *i.e.* each new super-ordinate narrative goal is obtained from a given one by asking (and justifying) "why would one want to achieve the given goal?" The ludological side is best read top-down (you finish *SMB* by removing Bowser) whereas the narrative side is best read bottom-up (you defeat Bowser *for the purpose of* saving the Princess). The hierarchies and their mapping is relative to individual playthroughs, and

depends on both the game and its surrounding context. For instance, our interpretation of *SMB*'s *To Finish* as "Save the princess" is plausible due to the repeated *feedback* by rescued Toads: "Thank you Mario! But our princess is in another castle!" *but also due* to the game's packaging, which asks: "Do you have what it takes to save the Mushroom Princess?" (Figure 6). This means that players who start the game without paratextual information may only realize the game's *ultimate narrative goal* once they *reached* the final location of the first castle.

However, interpretations can be fragile. For instance, nothing indicates that the player is in fact "destroying the bridge with an axe:" the corresponding animation is of such low framerate that a player may walk away with an alternate interpretation (*e.g.* the bridge retracted). Further, is the object at the location to reach even an axe? Its feedback suggests that via a *prototypical* (Lakoff, 1999) appearance, but the authors disagree: the third author sees it as a lever. In both cases it is the task of narrative designers to match feedback for a ludological goal to narrow the players' potential (existing) interpretation down towards the designer's intended (preferred) interpretation (conversely, a game designer might need to craft a ludological goal that aligns with the narrative designer's intended feedback).

Our definition acknowledges both narrative *and* ludological goals in a way that the quest literature does not (*cf.* Howard, 2008; Aarseth, 2004; Tosca, 2003), as pointed out in §2.1. Because narrative goals are interpretations of ludological ones, they entail the ludological and narrative goal hierarchies. *Both* hierarchies are necessary to discuss narrative goals that are moment-to-moment or about the game's ultimate *narrative goal* (as suggested by its designers). In *SMB*, a moment-to-moment narrative goal might be to "Dodge the fireball," needed to satisfy the imperative that results in the game's end. Further, the feedback in Figure 4 scaffolds the player's interpretation of their accomplishment: the player's *quest*—a prominent element in primarily-narrative games (Howard, 2008)—is over. This reinforces that one way to narratively make sense of *To Finish* is as "Save the Princess." Thus, narrative goals as quests are in and of themselves insufficient in capturing varying levels of narrative details that emerge in games. But what of author, character, and player (narrative) goals? We argue that these senses help *drive the interpretation* of some in-game imperative goal. We discuss each in turn.

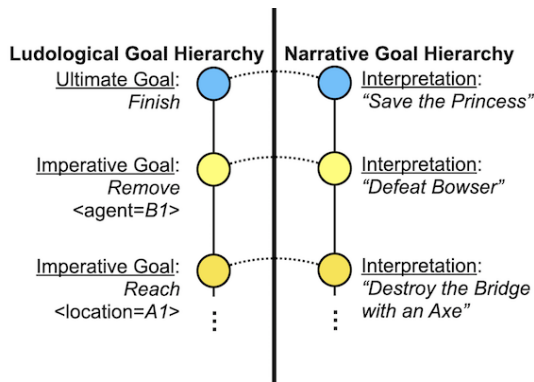


Figure 5: The parallel goal hierarchies of *SMB*. The right side goal ("Save the Princess") indicates the suggested reading of its left side counterpart (*To Finish SMB*).

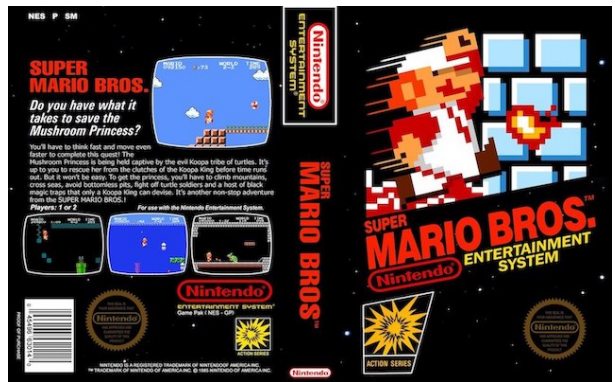


Figure 6: *SMB*'s packaging asks: "Do you have what it takes to save the Mushroom Princess?," which supports interpreting *SMB*'s ultimate goal as "Save the Princess."

An author goal is an *afterstory* goal: a *particular* interpretation the author *intends* to elicit about some imperative. This might seem more related to "author goal as preservation of experiential goal," seemingly ruling out "author goal as preservation of a prescribed narrative (discourse) arc or collection of story beats." However, the latter kind of author goal is tantamount to the desire of exerting control over the interpretation of the game in the player's mind. We view the preservation of story beats as a desire to constrain the space of possible satisfying traversals. Because each satisfying traversal achieves some desirable audience (cognitive/affective) effect, we posit that preserving a collection of story beats fundamentally comes down to constraining the space of *satisfying interpretations* of the gameplay experience.

A character goal is—plainly—a narrative goal at a lower (more-concrete) level of abstraction than the narrative goal that demarcates a quest. When thought of as expectations of player activity, they align perfectly with a narrative goal; the underlying imperative is what contextualizes said activity. When thought of as ways to structure the behavior of AI non-player characters, they are still narrative goals, but are those whose achievement is not necessarily restricted to the player. Whether or not narrative goals are better remembered than (wholly abstract) ludological goals is an open question that bears further exploration.

While player goals are outside of our scope, we briefly sketch what narrative player goals might mean. A narrative player goal *vis-à-vis* enacting stories might mean having a preference of which afforded actions to pursue in service of satisfying a narrative goal. A narrative player goal *vis-à-vis* desire to have certain experiences might mean having an *interpretative* preference for how to make sense of a ludological goal that gives rise to an interpretation the player is interested in exploring. For example, a player might be interested in completing a "pacifist", "genocide", or "neutral" run of a game like *Undertale* (Seraphine, 2018).

Finally—perhaps paradoxically—narrative goals need not be tied to storygames! While it is useful to distinguish storygames, games writ large can elicit afterstories. However, we do not intend to shift to a pure “reader-response” perspective wherein afterstories are a byproduct of purely **interpretative** activity (Aarseth, 1997). On the contrary, the structural elements of games play a direct role in how the afterstory is constructed in the mind. Structurally, storygames may have more narrative elements that facilitate a player’s sensemaking of their experience *as* a narrative. But, relative to storygames, non-storygames (a) have available to them the same phonological channels (*e.g.* sounds, graphics, haptics) to communicate information to the player, and (b) also require the player to act toward structurally-meaningful (ludological) goals. In both storygames and non-storygames, the interface—the format through which narration happens—that communicates the game’s structural elements can be designed to scaffold (or not) the mental construction of particular afterstories. Either way, the game’s interface is what effects a change in a player’s sensemaking, which results in a narrative—specifically, an afterstory—“materializing” to the degree desired by the designer.

Our definition is a middle ground between narrative goals as entirely pre-scripted narrative or entirely as user-fabricated narrative. It also avoids equating the gamestory (the actual sequence of events or log of what happened) to the afterstory (what the player understands that sequence of events to be). Instead, we hope to pave the way toward understanding how these are related. As we illustrate in §4, this better-affords analytically approaching story-relevant game phenomena such as *ludonarrative dissonance* (amongst others).

4. Analyzing Story and Gameplay Alignment

GFI groups three analytical, separate, causally-linked, and perspective-dependent lenses (Figure 7). Through them, we straightforwardly unpack several thorny issues around how story and gameplay align or not; these analyses lend support to the utility of GFI.

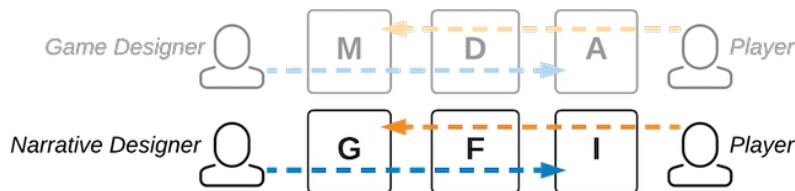


Figure 7: Goals (like mechanics) are closer to the designer perspective. Interpretation (like aesthetics) is closer to the player. Feedback (like dynamics) bridges between these.

4.1. Ludonarrative Dissonance and other Forms of Incoherence

(Game designer) Hocking coined the term *ludonarrative dissonance* in describing playing *Bioshock* (Irrational Games, 2007): “[it suffers from] a powerful dissonance between what it is about as a game, and what it is about as a story” (Hocking, 2009, p. 256) The term has since been widely adopted, critiqued, and reformulated as (1) *narrative disruption*, when the rules and fiction conflict and confuse/frustrate players (Tocci, 2008), and (2) *aesthetic rupture*, when the setting and mechanics (alternatively, fiction and rules) fail to harmonize (Bateman, 2017). In GFI, ludonarrative dissonance, rupture, and incoherence, can be articulated as a mismatch between the ludological and narrative goal hierarchies.

For example, games with the ultimate goal *To Prolong* often suffer from a certain amount of incoherence when they also include a “campaign” or “story mode” with an overarching conclusive narrative goal. The incoherence arises because there is no clear narrative goal that makes sense of the ultimate one. In *Destiny* (Activision, 2014), once players achieve the narrative goal of “Defeat Atheon” (the final boss of the games’ raid), they return to the gameworld where nothing has changed and the raid remains available to complete. Even once all of the game’s most significant narrative goals have been achieved (*e.g.* side-quests and secondary missions), the player should still continue *To Prolong* their

play. The lack of an “infinite narrative” (that aligns with *To Prolong*) poses a challenge if we want to see games without this fundamental incoherence.

In practice, the lack of an “infinite narrative” is addressed via additional releases (*e.g.* expansion packs and downloadable content) that extend a game’s narrative. Consider the example of *World of Warcraft* (Blizzard Entertainment, 2004, *WoW*), a Massively-Multiplayer Online Game originally released in 2004. It featured a story that players could complete: first, by killing Ragnaros, the Firelord; months later Nefarian, the Lord of Blackrock; then C’Thun, the Old God of madness and chaos; then Kel’Thuzad, the Lich Lord of the Plaguelands. These iterative narrative expansions were all included in only *WoW*’s first version before the game’s first expansion *The Burning Crusade* (Blizzard Entertainment, 2007) added more extensive gameplay options and also advanced the game’s narrative beyond the original world of Azeroth. This has continued over the years with further expansions, each extending and continuing the narrative. Sometimes, as in the case of *Cataclysm* (Blizzard Entertainment, 2010), this means seemingly irreversible changes to the game’s world. Here, the game’s narrative designers had to figure out how to support their current players (who were familiar with the game’s plot over the years) with new players jumping *in media res*. In this sense *WoW* has an infinite narrative, but the game’s creators are unable to design it faster than the players are able to complete it. This trend continues today with companies offering “games as a service.” Some game narratives are developed and produced similarly to serialized television shows and soap operas. Bungie, the developers of *Destiny 2*, organize the game’s post-release content in “seasons” with each season continuing the game’s story as part of an overall evolving world.³ However, unlike a multi-season television show, game players are generally unable to experience a game’s narrative from the beginning all the way up to the present.

There is also often dissonance/incoherence in games with multiple endings. *Nier: Automata* (PlatinumGames, 2017) has 26 different endings “one for each letter of the English alphabet” (Jacevic, 2018). While many endings are optional, the player is required to successively complete the first five in order to witness all of the scripted narrative (Jacevic, 2018). This creates dissonance: the game “indicate[s] to the player that an ending has been reached, only to enable continued play afterward, while coding the post-end portion of the game not as something extraneous, repeated, or additional, but an actual part of the game” (Backe, 2018). Thus, each time the player feels like they have completed the ultimate ludological goal *To Finish*, they learn that its narrative counterpart has not been fully realized: “[the game] continually deprives the player of a sense of narrative closure” (Jacevic, 2018) with successive playthroughs requiring a re-interpretation of the game’s ultimate narrative goal as new elements are introduced. For example, “reaching the B ending is a matter of following the same core narrative events from the perspective of the android 9S instead of 2B, with only small narrative additions and gameplay alterations” (Jacevic, 2018).

4.2. Edge-cases of the Parallel Hierarchy

What if the Parallel Goal Hierarchies are imperfectly mapped? We consider two cases: there is a ludological goal with no evident narrative goal and *vice-versa*.

When a ludological goal has no evident narrative goal, the player has no interpretation and thus no way to know the ludological goal exists. The only way for this ludological goal to be achieved is for the player to meet it by chance. There are at least two contexts in which this happens regularly. The first is via cheat codes. Here, barring the use of external guides or references that let the player know of the existence of the ludological goal, they can only be discovered by happenstance - a player observes something unexpected and realizes it was “triggered” by conditions being met in a particular context. The second is through meta-reward structures such as secret trophies or achievements (Hamari and Eranti, 2011). From the player’s perspective, these ludological goals are met, but the player had no way of anticipating them from anything communicated via the game. Consequently, the player has no way to make sense of what happens other than appealing to conventions of the medium (Brice, 2013), *e.g.* “PS4 games have trophies”, “*Konami* games often have the *Konami* code”, “developers often include secret codes”. A player unfamiliar with these conventions would experience the triggering of a cheat code or trophy/achievement as surprising and potentially confusing *because* of no evident narrative goal.

Conversely, when a narrative goal has no evident ludological one, a player has no way of achieving said goal in the game. This can lead to player frustration, confusion, or disappointment (“The game asks that I do this thing, but it’s impossible!”). For example, in *Risk of Rain 2* (Hopoo Games, PlayEveryWare, 2019) alternate character skins can be obtained. The game instructs the player to “Beat the game or obliterate yourself on Monsoon.” If the player’s interpretation does not apply the condition “on Monsoon difficulty” to both beating the game *and* obliterating themselves, they end up in a frustrating, groundhog-day like battle against the final boss Mithrix—on normal difficulty.

³See <https://www.bungie.net/7/en/Seasons/SeasonOfTheUndying>

In other cases, the lack of a ludological goal that corresponds to a narrative goal might be the result of a mistake or flaw in the game's implementation: a player is told to activate a light switch, but it doesn't work due to a software bug (Lewis, Whitehead and Wardrip-Fruin, 2010). Sometimes, it might be the result of purposeful design. Narrative designer Chella Ramanan describes a scene in *Before I Forget* (3-Fold Games, 2017), a game that "takes place in the soft pastel-colored home of Sunita, a woman with early onset dementia" (Webber, 2019) in which players were reasonably confused:

We have a scene where she's looking for the bathroom, and [...] every door [players] open turns up in the same place, no matter which... [Players] were trying to see a system and a logic when dementia doesn't have any."

Ramanan as cited by Webber (2019)

4.3. Localization, Remakes, and Sequels

The existence of different "versions" of a game can also lead to interesting phenomena related to the mapping of the ludological and narrative Parallel Goal Hierarchies. Consider the case of game localization. *Localization*, when a game is modified in order to be sold in a new market (O'Hagan and Mangiron, 2013), is different from translation because:

...localizing a video game may involve making technically or culturally motivated changes that go beyond its textual structure, such as modifying the game code to accommodate the graphical discrepancies between source language and target languages (*e.g.* font types) or even adjusting the game's marketing strategies.

Czech et al. (2013)

Thus, localization often results in transcreation: departing from the original source to an extent such that the target is significantly different (O'Hagan and Mangiron, 2013).

In view of GFI, localization requires transforming a game's Narrative Goal Hierarchy to preserve the relationships between narrative goals and their ludological counterparts. When done poorly, the intended meaning of the player's activity can become opaque. Czech's (Czech et al., 2013) study of the Polish game market demonstrates how *Call of Duty: Black Ops*' narrative goal of "obtaining a killing spree"—*Removing* (defeating) a certain number of opposing players while *Preventing* your own *Removal* (defeat)—can become disassociated from its ludological goal. Due to poor localization, the Polish translation for a killing spree reads as obtaining "a series of victims" or "a series of donations" (Czech et al., 2013).

Osu! Tatakae! Ouendan! (iNiS, 2005, Ouendan) is a rhythm-action game first released in Japan and later localized by the same developer into *Elite Beat Agents* (iNiS, 2006, EBA) for the North American (NA) market. The developer aimed to provide an experience comparable to Ouendan for NA audiences (Lepre, 2014). Interestingly,

...the localization team was not afraid to modify many of the aspects of Ouendan that were not part of the core gameplay. The result is a game with new characters and stories, as well as a new soundtrack – [...] one of the most relevant components in a rhythm game. Nevertheless, the Japanese game and the localized version feel strikingly similar, as the gameplay is virtually unchanged. [...] [EBA] retained the concept, mechanics and general atmosphere of [Ouendan], but involved a complete overhaul of both the textual and audiovisual elements.

Lepre (2014)

Ouendan and EBA are *ludologically* the same⁴ but *narratively* different: the localization process effectively replaced Ouendan's entire narrative goal hierarchy with a new one. However, the new narrative goal hierarchy (EBA's) was mapped onto the same ludological one as Ouendan.

More broadly, examining games from a goals-perspective can help us articulate the relationships between games that are remakes, adaptations, reskins, clones, ports, conversions, sequels, and more (Grabarczyk and Aarseth, 2019). Grabarczyk and Aarseth explain that a "reskin" is a game that is exactly the same as an original except that it has a

⁴To be fair, they're *mostly* the same. The game's difficulty was reduced for NA.

new “presentation layer”- its looks, sounds, and narration are completely different (Grabarczyk and Aarseth, 2019). While their framework does not yet explicitly consider goals, we feel this work may complement their approach: a game whose narrative goal hierarchy has been replaced while maintaining the ludological goal hierarchy might be the same as a reskin.

5. Designing for Story and Gameplay Alignment

In addition to its analytical traction, GFI *also* has generative traction to help us design games. Figure 8 illustrates a game-centered *interaction framework* (Abowd, 1991); it charts how GFI fills in gaps in the MDA model that must be filled to account for narrative design-related phenomena. In it, the (game) System contains the Ludological Goals that must be achieved for players to succeed at the game. These are presented to the player via Feedback that the Player observes and interprets. Interpretation yields the player’s mentalization of Narrative Goals that motivate which tasks they end up pursuing, which forms part of their Aesthetic experience. Players attempt to carry out those tasks by articulating them through the game’s afforded Mechanics, which result in run-time Dynamics that perform an update on the underlying game’s System.

Under this framework, we propose that (1) *interpretation* is what should be considered as the end result that guides narrative design refinement, and (2) *goals* (with corresponding *mechanics*) and *feedback* are what should be refined to effect change in that interpretation. How to do so is beyond the scope of this article. Rather, we briefly chart design challenges around player *expectations* (Murray, 2011) that GFI helps us grapple with.

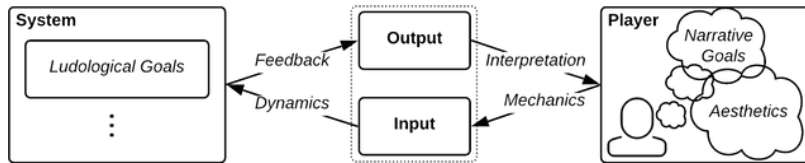


Figure 8: An interaction framework for games that identifies how GFI fills in conceptual gaps in MDA that must be filled to account for narrative design.

5.1. Setting Up and Satisfying Player Expectations

Games are communicative acts (Crawford, 2003; Cardona-Rivera and Young, 2014). In them, players/audiences expect designers/authors to “cooperate,” as in dialogue (Grice, 1957): speakers are tacitly expected by hearers to be as detailed as they *need* to be, truthful, on-topic, and clear (Grice, 1975). Authors rely on or flaunt these expectations for communicative effect. For example, a seemingly random element of a story may have its purpose revealed later in the discourse (*e.g.* *Chekhov’s Gun* (Rayfield, 2000)) or may lead audiences astray (the *Red Herring* (Turco, 1999)). The Parallel Goal Hierarchies give us the language to describe how designers can *also* setup and manipulate player expectations. Succinctly, players might be offered feedback to scaffold certain narrative goal interpretations, creating expectations about gameplay via the ludological goals they motivate, which in turn may be satisfied or subverted (for an examination of how player’s intentions are communicated to a game see (Martens and Hammer, 2017)).

In *The Elder Scrolls V: Skyrim* (Bethesda Game Studios, 2011, *Skyrim*), players often navigate mountainsides with dangerous chasms, cliffs, and waterfalls: they likely perceive the in-game consequence of certain death if they were to fall. However, at the edge of a particular waterfall, players are prompted with feedback that scaffolds a narrative goal: an audio cue with associated textual overlay that reads “Bard’s Leap Summit Discovered,” as illustrated in Figure 9.

Given the prompt’s timing (expectation of relevance) and content (expectation of detail), one rational interpretation is “Jump off the waterfall,” with the implied (and dangerous) ludological goal *Reach-Base* of waterfall. Another possible ludological goal derived from this narrative goal would be *remove-Player Character* from gameworld (die, by jumping off the waterfall). This indicates that a given narrative goal’s ludological counterpart goal can often only be truthfully understood retrospectively (there is no way for the player to know that death will not result when jumping off this particular waterfall without taking a leap of faith).

The interpretation emerges because in *Skyrim* that kind of overlay appears whenever a player enters a significant place (*e.g.* a city or tomb). Only if the player acts to satisfy the implied ludological goal (*i.e.* by jumping off the waterfall), does the player land safely in a pool, encounter a ghostly bard who describes their unsuccessful dive, and are rewarded with an in-game skill-boost. Importantly, the player cannot encounter the ghost by simply exploring



Figure 9: In-game discovery of the *Bard's Leap Summit* in *Skyrim* (Bethesda Game Studios, 2011). Its feedback elicits a narrative goal, which suggests the ludological goal of *Reach-Base of Waterfall*.

the base of the waterfall; the player *must* execute the dive. This suggests a designer's *intentional* structuring of the feedback to elicit the narrative goal.

This is related to *narrative affordances* (Cardona-Rivera, 2019), action opportunities that players imagine will continue their unfolding story. In GFI, this is tantamount to eliciting and *satisfying* a player's expectations by way of a narrative goal that motivates a ludological one, the latter then recognized (and possibly rewarded) by the game.

5.2. Subverting and Shifting Player Expectations

In contrast, the story of *Spec Ops: The Line* (Yager, 2005) diverges from the conventional hero story. It leads U.S. Army Captain Walker—the player-controlled protagonist—into taking ethically fraught actions (Jørgensen, 2016). As it unfolds, the player's interpretation of the ludological goals is shifted: expectations of the medium (Brice, 2013) (“You’re a hero, so hurting enemies is the right thing to do”) and of the genre (Abell, 2015) (military shooter) are narratively questioned and then *subverted* (“You’re a war criminal who has just harmed civilians”). This was an intentional move by the designers of the game:

From the beginning of developing *Spec Ops: The Line*, we really set out to upend the player's expectation. There was this strong foundation that was set before we ever started developing in the military shooter genre for experiences that led the player to gratification and to the feeling of heroism for doing exactly what they are told to do with their weaponry and in these military scenarios. That provided this foundation for us to “flip the narrative.” We started out in that familiar place for the player, with friendly and expected squad mates that seemed like they almost could be from another game that you’ve played. But as you get a little bit further in and those decisions and those scenarios become a little less black and white, and [more] gray area, the narrative sort of “flips” as you begin to re-evaluate *why* you’re doing the things you are doing.

Interview of Cory Davis, Lead Designer and Developer, *Spec Ops: The Line* (Yager, 2005)

This is possible because actions in stories can be *functionally polyvalent* (Doležel, 1990): in *SpecOps*, “Soldier harms enemies” narratively *functions* (Propp, 1968; Prince, 2003) as “heroism” in the player's initial interpretation and is shifted to function as “villainy” via feedback that reinforces an *anti-hero* (Shafer and Raney, 2012) interpretation.

Similarly, Brenda Romero (née Brathwaite), leveraged multiple interpretations in her boardgame *Train* (Brathwaite and Sharp, 2010) via the use of purposefully ambiguous mechanics and game elements. In *Train*, players are tasked with efficiently loading and delivering boxcars with yellow meeples to a terminal station only to learn the name of the destination towards the end: Auschwitz. Many players “realize” the intended meaning of the game's narrative goal, and then subversively act against the game's ludological goals: “Some of these players would derail the cars, while others would create virtual ‘Denmarks’ to give refuge to the tokens” (Brathwaite and Sharp, 2010).

6. Conclusions

GFI bridges narrative and game design and development, interactive digital narrative studies, and game research. In this paper, we use it to articulate what the activity of narrative design *is* and to explain phenomena that emerge from this design activity. We have presented GFI as a framework of modellable components, and have also presented models for each component; Goals are modeled with our Ultimate/Imperatives typology from prior work (Zagal et al., 2019; Debus et al., 2020), Feedback is modeled with a typology imported from linguistics summarized in Table 3, and Interpretation is modeled via the question-answering focused Sequence Method (Landau, 2013) and via a typology of potential desirable outcomes.

GFI supports systematic design iteration: anticipating how changes to the game’s structure will manifest in effects on players, to better align stories and gameplay to achieve a designer’s intended effect. By traversing GFI’s three levels of abstraction, we expect designers can better conceptualize games, which might help “control for undesired outcomes, and tune for desired behavior” (Hunicke et al., 2004).

Throughout this paper, we decomposed games writ large, including ones that are not necessarily narratively-centered. This speaks to a fundamental claim that GFI buys into: all games afford to be interpreted *as* stories. This is vacuously true because we are narratively intelligent (Herman, 2013) and as Aarseth (2012) has stated: people can narrativise anything. *Tetris* (Pajitnov and Pokhilko, 1984) is sufficiently representational (Bateman, 2013) to afford discussing as symbolizing American life (Murray, 2017) or bodies in a grave (Koster, 2013) but the Feedback and with it the goal hierarchy mapping is too vague to support or validate either interpretation.

The *point* of articulating GFI is to suggest that, while all games “tell” stories, some stories are more *intended* than others. Game designer Chris Bateman (2013) argues that everything that is representational—*i.e.* all feedback—contributes to the narrative. Thus, a game’s potential for narrativization is proportional to the degree it communicates non-abstract information. The story in *SMB* is interpretatively simpler than that of *Skryrim*, but they are *both* stories nonetheless by virtue of being communicated via non-abstract feedback (*i.e.* phonological, lexical, grammatical, and denotational information). Thus, to elicit *intended* stories instead of alternate player-narrativizations, designers should center on manipulating the game’s feedback. Our future work will explore *how*.

By formally understanding game design, we are better able to analytically describe particular game experiences, systematically investigate and predict causal determinants of those experiences, and better articulate the relevance of these research efforts to game design practice. GFI helps make sense of *how* game experiences are intrinsically narrative ones; we use it to reject the long-standing “antagonistic” relationship between story and gameplay as a false dichotomy. Both storygames and non-storygames have the potential to elicit afterstories, due to how feedback shapes a player’s interpretation of what they must ludologically do. This interpretation then supports the player in motivating their activity. To us, narrative design is more about constraining the space of designer-satisfying interpretations than about the specific means for doing that (*e.g.* screenplay writing, dialogue authoring, asset creation). Narratives are not “uninteresting ornaments” (Eskelinen, 2001) to games; they are vital ones—studying how narrative goals are related to ludological counterparts is interesting, fruitful, and necessary. To underscore a previous remark by Cardona-Rivera et al. (2020b): “To study a game is to study its narrative, and to study a narrative in games is to study its gameplay.”

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Narrative Goals

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