

Generative Games as Storytelling Partners

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ABSTRACT

Gameplay involving player creativity can be both satisfying for players and enticing for designers to pursue, but understanding of how to design deliberately for player creativity remains limited. In this paper, we propose that a class of features previously identified as common elements of “gardening games”—including generativity, limited player control, and “incrementality” or “idleness”—are also particularly conducive to player creativity. By analyzing narrative artifacts created by players as retellings of their play experiences in games that implement these features, we highlight how these features enable players to overcome specific barriers to creativity. Based on this analysis, we then offer concrete suggestions to game designers who want to facilitate player creativity and propose ways that the design patterns discussed here might be extended to further support creative activity by players.

CCS CONCEPTS

• **Applied computing** → **Computer games**; • **Human-centered computing** → Interaction design theory, concepts and paradigms;

KEYWORDS

co-creativity, player creativity, design patterns, retellings, gardening games

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1 INTRODUCTION

There is a close relationship between creativity and play. Nevertheless, expressing one’s self creatively is hard, and can remain difficult even in explicitly playful contexts. Many internal barriers can interfere with the creative mindset, and players who are unused to thinking of themselves as creative may balk at the prospect of game mechanics that force them to create as part of play. Specific design strategies may need to be employed to get and keep these

players in a mindset where they are willing and able to express themselves creatively.

The idea that games and other playful interactive systems can serve as sites of creative self-expression is not a new one. In particular, several distinct strands of thought have emerged to offer approaches to the design of playful interactive systems intended to enable creativity, all of which offer useful perspectives on the problem of encouraging players to create as part of play.

Yannakakis and Liapis [20] introduce a new subfield, termed *mixed-initiative co-creativity*, at the intersection of digital creativity support tools and computational creativity. Mixed-initiative co-creativity research concerns itself with artificially intelligent systems that are intended to collaborate with humans on creative tasks, exercising somewhat more control over the output of the creative process than mere tools but still allowing human creators to retain a good deal of control over the output as well.

Samuel’s dissertation [14] discusses the notion of *shared authorship* in interactive narrative play experiences, especially focusing on games and other interactive experiences that aim to make the player feel as though they are producing a story or other “narrative artifact” in collaboration with the game or system.

Finally, and perhaps most importantly in the context of this paper, Compton and Mateas [4] introduce the idea of *casual creators*: a particular class of digital creativity support tools that blur the lines between tools and toys and are intended to support casual use. The paper makes a distinction between *goal-directed* creativity, in which the individual engaging in the creative activity is attempting to accomplish a particular goal or has a particular outcome in mind, and *autotelic* creativity, in which the individual engaging in the creative activity is doing so primarily for enjoyment of the creative process rather than out of the desire to achieve a specific outcome. Casual creators are intended to support the latter kind of creativity.

Of these three approaches, only the shared authorship approach concerns itself directly with games as such. Nevertheless, although games are rarely positioned explicitly as creativity support tools, many players continue to make use of games for the purpose of creating things—sometimes even with creation as a primary goal. Therefore, in our view, it might well be worthwhile to evaluate games that players seek out and use for creation as if they are creativity support tools.

In this paper, we first catalogue four potential barriers to creativity that may discourage creative expression by players or get in the way of the player’s creative process. We then narrow our focus to a particular form of player creativity, which we describe as *dialogic retelling* of play experiences, and present several examples of successful dialogic retellings. We extract common design elements from the games that were used to produce these retellings and show how these design elements may help players circumvent the barriers to creativity that we discuss. Finally, we draw a connection

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between these extracted design elements and the key identifying elements of “gardening games,” with the goal of showing that this particular class of generative games may offer a new perspective on how to facilitate player creativity through design [10].

2 BARRIERS TO CREATIVITY

The process of creative self-expression can be both enjoyable and beneficial to those who undertake it. Therefore, we want to make games and playful systems that enable and encourage players to express themselves creatively. However, getting and keeping players in a state of mind where they are willing to be creative can be difficult. The very idea of creativity can be intimidating. Many people are unused to thinking of themselves as creative, and may conceive of an activity that they consider creative (such as writing, drawing, or music-making) to be the exclusive domain of the naturally talented, rather than a set of acquired skills that they themselves can learn. Honest creative self-expression requires a degree of vulnerability, leaving many people hesitant to perform creative activities when they feel that others may be watching and judging them for the creative decisions they make. A blank canvas or an empty page can strike terror into the hearts of even the most experienced artists and writers; similarly, if a game hands the player a blank canvas, a set of tools, and instructions to create something, the player may well freeze up immediately due to their inability to answer the question of what they should create. And finally, even if the creative process goes well at first, “writer’s block” can set in at any time, leaving players stuck at a point where they don’t know how to proceed. To deal with these problems, games and playful systems that want players to express themselves creatively need to find ways to lower the perceived stakes of participating in creative activities.

2.1 Fear of the Blank Canvas

One common phenomenon that may inhibit creativity is the sense of fear or intimidation that many creators report when first faced with a blank canvas or blank page (either literal or metaphorical) at the start of the creative process. It is often said that “constraints breed creativity,” and the blank canvas represents a highly unconstrained state; this lack of constraints may leave creators paralyzed by uncertainty regarding where and how to begin.

To alleviate the fear of the blank canvas, Victor [18] has stressed the importance of making it possible for users to “create by reacting,” pointing out that many creators do not begin the creative process with a fully formed idea of what they want to create already present in their heads. Instead, they frequently begin by doing their chosen medium’s equivalent of “pushing paint around on the canvas” or “noodling around” on a musical instrument, taking any steps necessary to get past the blank canvas and reach a point at which they can begin to create by reacting to and adjusting something external they can perceive. In Victor’s words,

An essential aspect of a painter’s canvas and a musical instrument is the immediacy with which the artist gets *something there to react to*. A canvas or sketchbook serves as an “external imagination”, where an artist can grow an idea from birth to maturity by continuously *reacting to what’s in front of him*.

In the context of casual creators, Compton and Mateas [4] have also proposed “no blank canvas” as a design pattern with the specific intent of avoiding or mitigating the effects of this barrier.

2.2 Fear of Judgment

Another creativity-inhibiting phenomenon that many creators report struggling with involves the fear of criticism, judgment, or other negative assessment of the things they create. Fear of being judged for the things they create may leave creators hesitant to be as expressive, vulnerable or original in their work as they would like.

In some cases, tools intended to provide their users with creativity support end up exacerbating the fear of judgment through their attempts to provide users with feedback on their designs. Cross’s early experiments in the simulation of computer-aided design [5], in which one human participant played the role of an architect and another played the role of an artificially intelligent architectural design tool, suggest a potential reason for this phenomenon. Cross tested two scenarios, which he described as the “forward” and “reverse” scenario; in the “forward” scenario, the architect was responsible for creating designs, while the computer critiqued and gave feedback on how to improve these designs. In this scenario, the architects often found the collaboration to be both difficult and stressful, even if they appreciated the feedback on their designs. Meanwhile, in the “reverse” scenario (in which the “computer” participant was responsible for generating possibilities and the “human” for modifying, critiquing and refining these possibilities), the architects were much less likely to report the activity as stressful and much more likely to describe it as easy, enjoyable, or even fun.

Compton and Mateas [4] address the fear of judgment and the way that tool-provided feedback may aggravate that fear by suggesting “entertaining evaluations” as a design pattern for casual creators. One example of this can be seen in the “abstract generative art game” *BECOME A GREAT ARTIST IN JUST 10 SECONDS*, which juxtaposes the player’s glitch-art creation with a classic masterpiece painting and rates the player’s work by percentage similarity to the obviously unattainable goal state. Paradoxically, by presenting players with a goal state that clearly cannot be reached using the tools provided by the game, *GREAT ARTIST* may actually assist players in overcoming the fear of judgment—partly by allowing them to blame their “failure” to reach the goal state on the limited tools with which they have been provided rather than on their own artistic vision, and partly by framing the process of judgment itself as playful and inherently ridiculous rather than a true arbiter of what constitutes great art.

2.3 Writer’s Block

Even when the creative process is going well, it is nevertheless quite possible to suddenly find one’s self at an impasse, unable to think of what step one should take next in order to continue the process. This phenomenon, commonly known by practitioners as “writer’s block” or “artist’s block,” can be substantially disconcerting when it occurs, and strategies for dealing with it are a frequent topic of discussion in practitioner-focused books about, for instance, “how to write.” Writer Anne Lamott, for instance, dedicates a whole chapter of her book *Bird by Bird: Some Instructions on Writing and*

Life to the subject of writer's block [11]. She characterizes the subjective experience of suddenly becoming creatively blocked as follows:

A blissfully productive manic stage may come to a screeching halt, and all of a sudden you realize you're Wile E. Coyote and you've run off the cliff and are a second away from having to look down.

Evidently, strategies for avoiding or mitigating the effects of this condition are much to be desired where they can be found.

2.4 Perfectionism

One final creativity-inhibiting phenomenon commonly described by creators is perfectionism, in which a creator feels that imperfections or flaws in their work must not be tolerated. This can lead them to avoid ever finishing or publishing projects, instead falling into a state of perpetual revision in which any imperfection “must be” corrected before the work can be presented to an audience or considered complete. It can also lead creators to frequently restart from the beginning of a project, rather than “play out” to completion an iteration of their vision that they know to be flawed. Under some conditions it can even manifest as a form of total creative paralysis that prevents any attempt to begin work.

As with writer's block, strategies for overcoming perfectionism are much in demand among practitioners. Natalie Goldberg, another writer, specifically instructs aspiring writers to set their expectations for their own work as low as possible in order to avoid paralysis due to perfectionism:

Sit down with the least expectation of yourself; say, “I am free to write the worst junk in the world.” [...] I've had students who said they decided they were going to write the great American novel and haven't written a line since. [9]

Likewise, as with writer's block, design strategies that can help would-be creators mitigate the effects of perfectionism are therefore highly desirable.

3 WHICH “PLAYER CREATIVITY”?

Our objective is to study how games can facilitate player creativity. Player creativity, however, can take many forms. What do we mean when we talk about “player creativity”? What specific kinds of creative activity do we aim to concern ourselves with in this paper?

First and foremost, we wish to investigate cases in which the player's creative process is shaped by engagement with the unique formal properties of digital games. With this restriction in mind, we do not wish to highlight the form of player creativity seen in, for example, machinima, in which the player uses the game as a kind of canvas on which to paint or an engine for generating illustrations to accompany a pre-authored script. Instead, we prefer to focus on a kind of creativity in which the game's systems are allowed to push back against, resist, react to, or redirect in unexpected directions the player's creative intent, producing a kind of adversarial yet generative relationship between the player and the system. In this sense, our focus is on the form of player creativity that has been identified as “co-creativity,” rather than on creative practices that

use games (or creative tools provided within games) as something like a traditional “inert” or non-reactive creative medium.

Moreover, we also wish to concern ourselves specifically with cases in which the player's creative process results in the construction of some concrete artifact. Narrowing our focus to this form of player creativity makes it much easier to frame our evaluation of a game's “creative potential” in terms of existing creativity support research. Although creativity may indeed be employed in, for instance, the process by which players generate novel puzzle solutions in puzzle games, these forms of player creativity do not lead to the production of concrete artifacts that we can evaluate, and so we choose to exclude them from the scope of this paper.

Taken together, these two restrictions on the kinds of player creative activity we are interested in studying naturally lead us to examine one particular form of player creative activity as a focus for our investigation: namely, the practice of *retelling*.

4 RETELLINGS AS CO-CREATED ARTIFACTS

Retellings, as defined by Eladhari, are narrative artifacts created by players as recountings of their play experiences [7]. Eladhari suggests that the existence of retellings of play experiences within a particular game or interactive narrative system may be taken as evidence that players found the experience compelling, and—by extension—as an indicator that the game or system in question is somehow successful. Moreover, Eladhari also proposes the analysis of corpora of player retellings as a way to understand and critique interactive narrative systems.

We propose to apply the framework of co-creativity to the problem of understanding how games support player creativity. From this perspective, the practice of retelling represents a form of player creative activity that produces concrete artifacts (the retellings themselves) in collaboration with the game. In retelling, the game and the player essentially work together as storytelling partners to produce a narrative that the player would not have been likely to produce alone. By examining the narrative artifacts produced by this co-creative process, we hope to find evidence of how the game's design may have had an impact on the co-creative process by which the artifacts were produced—or, in other words, of how the game may have acted to facilitate or support player creativity.

For our purposes, we will refer to the kinds of retellings in which we are interested as *dialogic retellings*. A retelling is dialogic when the player who creates it is meaningfully in dialogue with the game's systems during the creative process: rather than acting upon the game to bring it into line with a preexisting creative vision devised primarily outside the play experience itself, the player accepts creative input from the game in real time, allowing its systems to change the direction of the story at will and even directly contravene the player's creative intent. We draw a contrast between these and *monologic retellings*, in which the player more often ignores, rejects, discards, or overwrites the game's creative input than accepts it, treating the game less like a creative partner and more like a kind of raw material to shape according to their externally formed creative will.

One good example of monologic retelling can be found in some of the *Cities: Skylines* videos by donoteat01, who uses the game as a backdrop to tell stories about urbanism [6]. In this case, the game is

used more as a subordinate generator of illustrative imagery than a source of novel creative input; buildings, roads and the like are placed, manipulated and destroyed as needed to produce appropriate accompanying imagery for the creator's voice-over narration, largely without regard for their role in the game's ongoing process of simulation. Although the creator is indeed relating (or retelling) the events of a play experience, the game's systems are not at any point allowed to meaningfully interfere with the preordained story the creator intended from the beginning to tell.

5 SAMPLE RETELLINGS

Here we present three examples of dialogic retellings. We selected these partly due to their prominence (all three are relatively well known) and partly due to the way in which they each demonstrate evidence that the player did not merely use the game as an inert stage upon which to act out a predefined script, but allowed the game's systems to exercise meaningful creative input and influence or even outright determine the overall direction of the story. It is our hope that, by examining these retellings in parallel, other common elements will emerge, potentially showing how the design of the games in question facilitated the creative process of the players who authored these retellings.

5.1 *Matul Remrit*

Matul Remrit [16] is a *Dwarf Fortress* retelling that follows the exploits of a small band of dwarves as they attempt to found a stable, self-sustaining settlement (the titular *Matul Remrit*) in a hostile, uncaring land. Most of the story is told from the perspective of the individual procedurally generated dwarf characters; the events of each in-game month are narrated by a particular character, in the form of a succession of entries from that character's diary. Unusually for a retelling of a play experience in a single-player game, it represents a collaborative effort between four individuals: writer Kevin Snow; illustrator George Kavallines; musician Thomas Ferkol, who created the soundtrack for several video interludes; and editor Andi McClure. Among the community of *Dwarf Fortress* players and fans, who have collectively generated at least hundreds of published retellings, *Matul Remrit* is one of the best-known; the DFStories.com website, a repository of *Dwarf Fortress* retellings, lists it as a "highlight from the Hall of Legends" [1].

Here it is worth pointing out that, from a high-level structural perspective, the vast majority of *Dwarf Fortress* retellings are essentially identical to one another. The game's systems naturally lend themselves to the construction of stories in which a small and rag-tag band of founders construct a settlement, are initially successful despite minor setbacks, gradually build up the size and complexity of their settlement, inevitably succumb to some combination of hubris and natural disaster, and suddenly disintegrate, with the last survivors of the wreckage perishing in various gruesome ways. It could fairly be said that, if you've heard one *Dwarf Fortress* story, you've essentially heard them all. Nevertheless, players keep returning to *Dwarf Fortress* with the goal of constructing retellings in mind, suggesting that something other than plot-level originality motivates their desire to work with this game in particular as a creative partner.

The story of *Matul Remrit* proceeds in largely the same way as any other *Dwarf Fortress* story. Attacks by groups of elves soon shape up to be the biggest obstacle to the settlement's continued survival and growth; eventually, their numbers dwindling and facing an attack by an elven force of overwhelming size, the few remaining dwarves sacrifice themselves and the settlement to have their revenge, destroying not only themselves but also the invading force.

Throughout the story, the game's generative processes keep things moving forward by continually supplying the characters with new motivations, goals, and problems. The propulsive effect of the real-time processes that control the game world's calendar, the schedule of elf and monster attacks, and so on may have helped to prevent writer's block from setting in at any point in the (relatively lengthy) story: even when uncertain of how to proceed next, the creative team could always elect to let the simulation keep running without any specific guidance, which would inevitably generate a new scenario that had to be resolved in short order.

Moreover, the bounded nature of the player's access to the game's generative processes ensures that the player cannot just freely "pull on" the generator until they obtain the desired results. The game chooses what to generate and when to generate it without input from the player, and in so doing encourages you to remain where you are and "play out" the situation at hand (even if it seems that the current situation will inevitably result in the failure of your settlement) rather than abandon your settlement to seek a fresh start elsewhere in the world.

5.2 *Alice and Kev*

Alice and Kev [2] is a *Sims 3* retelling by Robin Burkshaw that follows two "homeless" Sims, a father (Kev) and a daughter (Alice), as they attempt to survive without access to either the ordinary features of an in-game home or forms of money-making that the author considers to be "unrealistically easy." The author makes a point of remaining faithful to the events of their actual play sessions, stating that their goal is to tell the story "with the minimum of embellishment," and repeatedly reaffirms their commitment to stepping back and allowing the Sims to do whatever it is that they want to do on a fairly regular basis. As a result, the overall direction of the story is evidently guided as much or more by *The Sims 3*'s systems than by the retelling's human author.

In *Alice and Kev*, as in *Matul Remrit*, the game's generative processes continually supply the characters with new impulses to act on. One especially powerful moment in the story takes place when Alice, having finally managed to secure a job, receives her first ever paycheck. Gripped by a momentary impulse, rather than using it to begin improving her own living situation, she instead elects to donate the entirety of her hard-earned money to charity [3]. At this point, the author of the story explicitly expresses reluctance to allow the simulation to dictate what happens next, and even considers intervening to prevent it. In this moment, the game's systems are in direct conflict with the player's creative intent—and yet, reaffirming once again a commitment to allowing Alice and Kev to live their own lives, the author eventually allows this scene to play out as the game has determined it should.

5.3 *Pro Vercelli*

Pro Vercelli [13] is a *Football Manager 2009* retelling by sportswriter Brian Phillips in which the author catalogues his efforts to restore the titular Pro Vercelli soccer team to greatness. The team—today relegated, in both the game’s simulation and the real world, to relative obscurity in spite of its run of championship successes in the early 1900s—makes for a natural underdog, and the author further embellishes his retelling of the team’s story with in-character sections narrated from the point of view of various procedurally generated characters, mostly players and staff for the team. The *Football Manager* games are unusual among sports games in that they do not allow the human player to directly control their team’s actions during a simulated match; instead, the player remains solidly in the role of the team’s manager, with match outcomes being determined semi-randomly based on the statistics and characteristics of the simulated players on the competing teams.

As with *Dwarf Fortress*, *Football Manager 2009* stories have a tendency to resemble one another quite closely. Successful playthroughs typically follow the player’s selected team from whatever initial status they occupy to a position of relative security as one of the top teams in the game’s simulated world, capable of reliably winning championships and standing against the other powerhouse teams. As might be expected, *Pro Vercelli* deviates little from this formula.

One remarkable moment in *Pro Vercelli* takes place toward the beginning of the series, as the author attempts to take advantage of his first opportunity to make trades for players with other teams [12]. Due to a misunderstanding of a certain nuance of the game’s budgeting rules, he finds himself engineering a deal that he lacks the funds to complete—and discovering his error only once he has already committed to the first half of the trade. This leaves him unable to cleanly undo the trade, and forces him to scramble to make more trades in order to compensate for his mistake.

In the context of creativity support tools, it is often generally accepted that the user should always be freely permitted to cleanly undo their actions wherever possible. Here, however, it seems likely that the lack of any straightforward way to cleanly undo the mistake is the reason that the mistake made it into the story—and the reason that it is narrativized as a moment of characterization for the team’s manager, rather than explained away as an extradiegetic lapse (or, more likely, omitted entirely). In this sense, by limiting or taking control away from the player, the game forces the player to incorporate imperfections into the story they are telling, resulting in what is arguably a more compelling narrative overall.

6 DESIGN ELEMENTS THAT FACILITATE DIALOGIC RETELLING

The retellings highlighted here share several common elements. In all of these cases, the author of the retelling started out with little high-level sense of where the story was “meant to” go; in this sense, they were truly making it up as they went along in accordance with what happened in the simulated game world, rather than imposing their will on the simulation. In all of these cases, the author of the retelling sought out the game primarily in order to co-create a story with the game, rather than producing the retelling incidentally based on a play experience they originally pursued for some other reason entirely. In all of these cases, the story, world,

or simulation naturally grew richer and more interesting over time. In all of these cases, the simulation had a level of autonomy; if allowed to keep running, things would keep happening even in the absence of input or intervention from the player. Finally, in each of these cases, the player’s control over the simulation was limited, rather than total: the player could not elect to fully impose their will on the simulation even if they wanted to, and the simulation would regularly push back against, resist, subvert, or redirect their creative intent.

It is our belief that these similarities between the retellings themselves are due in large part to similar design elements shared by all of the games that were used to construct them. We present these common design elements here.

6.1 Generativity

First, and perhaps most obvious, of the common elements between the selected games is the presence of generativity. *Dwarf Fortress* is known for featuring a fully procedural world, and generative processes that introduce new situations (such as monster attacks, or the arrival of traveling caravans whose members could be persuaded to join the player’s settlement) continue operating in the background as the player plays. *The Sims 3* is likewise deeply procedural, with generative processes finding their most prominent expression in the autonomous actions of both nominally player-controlled and non-player characters. And *Football Manager 2009* uses generative processes to periodically introduce new characters into the simulation, as well as to determine the outcome of matches between opposing teams.

Generativity plays several roles in the context of player creativity. First and foremost, generating an initial scenario helps to circumvent fear of the blank canvas by ensuring that players are never faced with a completely empty or unconstrained starting condition. Moreover, when generative processes are allowed to continue operating past the starting point of a playthrough, they can help to ensure that writer’s block does not set in by continually providing the player with new problems to address and prompts to react or respond to. Finally, by giving players a way to disclaim design decisions (essentially by saying that “the game did that, not me”), it may help to diffuse the player’s sense of responsibility for creative decisions and thereby mitigate their fear of being judged for the things they create.

6.2 Incrementality

Another key design element shared by all three games examined here is the presence of a simulation that can continue to run even in the absence of significant new input from the player. In *Dwarf Fortress* and *The Sims 3* alike, simply allowing the game to continue running without entering any input will cause the game world to continue growing and changing in real time; in *Football Manager 2009*, the player’s input is required to advance time, but on most timesteps, the player is generally free to allow the simulation to “stay the course,” i.e., to advance time without making any significant changes. This ability of the simulation to proceed without substantial player input ensures that it is nearly impossible for the player to remain truly blocked indefinitely. Even in a situation where the player has no idea how to proceed, merely allowing the

simulation to continue running will inevitably lead to the introduction of new prompts and possibilities before long.

On the subject of dealing with writer's block, Raymond Chandler—a writer of hard-boiled detective fiction—is alleged to have once given the following piece of oft-repeated advice: “When in doubt, have a man come through a door with a gun in his hand.” Each of the games examined here has at least one process that periodically and automatically performs an equivalent function. *Matul Remrit* was plagued by the periodic arrival of elven raiding parties; Alice and Kev were both moved by sudden impulses to take actions the player would not have been likely to deliberately suggest; and the cyclical nature of the professional soccer calendar in *Football Manager* ensured that *Pro Vercelli* would always find itself facing an opportunity to substantially change its lineup once per in-game year. In each case, by periodically injecting novelty into the simulation in the form of formulaic but reliably disruptive interventions, incremental processes helped to keep the highlighted retellings moving along, even (and especially) when they might otherwise have slowed down or ground to a halt.

6.3 Boundedness

A third shared design element between all of the games examined here is *boundedness*: specifically, boundedness of access to the game's generative processes by the player once a playthrough has begun. Unlike in some games (such as *Minecraft*) where the generator is invoked in response to the player's actions, for instance to generate new terrain for the player to explore whenever they travel to the edge of the currently generated area, all of the games examined here place the ability to invoke the generator deliberately out of the player's hands. In *The Sims 3*, Sims receive new urges largely independently of the player's actions; in *Dwarf Fortress*, the game chooses when and where to spawn enemies, travelers, and the like without any input from the player; and in *Football Manager*, the cyclical yearly calendar is responsible for determining when matches take place and when new procedurally generated characters will be made available.

In each case, preventing the player from deliberately invoking the game's generative processes once the game is in motion helps push back against the perfectionist tendency to restart at the first sign of trouble, encouraging players to “play out” the consequences of even problematic or undesirable events. The opportunities to which the player has access are limited; whether or not they like the results they get from acting on these opportunities, they are not permitted to freely re-roll the dice until they get a more desirable outcome.

6.4 Limited Player Control

One effect of the other design elements of the highlighted games is that player control over the outcome of their actions remains ultimately limited. Unlike in games that are traditionally seen as placing player creativity front and center, these games—due to their use of largely player-independent generative processes—tend to subvert or complicate the player's intent, rather than allowing events to play out exactly as the player intended. In other words, rather than using the game as a canvas upon which they are free to draw whatever they would like, players in these games tend to

find themselves forced into a form of creative compromise with the systems at work.

Paradoxically, the ways in which these games tend to subvert or even outright frustrate the player's creative intent may in fact play a role in helping players overcome certain barriers to creativity. In *Pro Vercelli*, for instance, the way the author is essentially strong-armed by the game's lack of a clean undo feature into accepting and narrativizing an objectively suboptimal decision suggests that limiting the player's control may in some cases serve as an effective means of combatting perfectionism.

7 GARDENING AS A MODE OF PLAY

The notion of gardening as a mode of creative play can be traced back to Wardrip-Fruin's *Expressive Processing* [19], which likens the experience of playing *SimCity* to that of gardening. More recently, Kreminski and Wardrip-Fruin [10] have introduced the term *gardening games* to describe a class of PCG-based games [15] (in other words, games that feature player interaction with generative systems as a core element of gameplay) whose play experiences similarly resemble gardening. Kreminski and Wardrip-Fruin describe several key features of gardening games, including generativity with bounded player access to the generator; the presence of a simulation or generative process that can continue running even in the absence of player input; default play patterns that tend to make the game world richer and more interesting over time, rather than to gradually drain or deplete it of its play potential; and limited player control in general. These features match up closely with the design patterns extracted from the games used to construct the three dialogic retellings highlighted in this paper, suggesting that “gardening games” may be an apt term to adopt for the class of games that aim to facilitate player creativity using the means described here.

There is a tradition in computational design of using anthropomorphic roles such as “clerk,” “partner,” “wizard,” “surrogate,” and “accountant” to classify computational systems by the space they occupy in the design process [17]. In light of the way that players sometimes deliberately make use of “gardening games” like the ones described here for the purpose of constructing stories, it may be appropriate to extend this taxonomy with an additional non-anthropomorphic role for the computer: that of the garden, with the human collaborator in turn taking up the role of the gardener. The use of gardening as a metaphor for co-creative processes involving human collaboration with generative systems is also endorsed by generative music pioneer Brian Eno, who draws a distinction between two forms of composing: a more traditional style in which the composer's role is seen as analogous to that of an architect, dictating every aspect of a piece of music from the top down, and a more modern co-creative style in which the composer takes on the role of a gardener whose purpose is to set up, tend, and curate the work produced by generative systems [8].

Although most games categorized as gardening games were not explicitly created with facilitating player creativity as a primary design goal, many of these games nevertheless seem to function well in this context. Players go about crafting retellings of their experiences in these games because they think there is something of value in doing so. In Eladhari's terms, players recognize in these games

a certain kind of “narrative potential”—or what could potentially be construed even more broadly as “co-creative potential”—and are drawn to it [7]. Thus, based on how players appropriate their play experiences in gardening games as raw material for dialogic retellings to a seemingly disproportionate extent, we think there is something important to be learned from these games about how to facilitate player creativity.

8 DISCUSSION

The games examined here are far from the only games for which notable individual dialogic retellings, or sizable corpuses of dialogic retellings, exist. Many strategy game player communities, for instance, have long-standing traditions of compiling “after-action reports”—many of which focus on blow-by-blow accounts of battles rather than narrative—for other players to read. It seems to lend credence to our suggestions here, however, that many of the other games for which large numbers of *narrative-focused* dialogic retellings exist feature similar design elements to the games we highlight. Narrative-focused after-action reports, for instance, enjoy particular popularity among players of the Paradox-published grand strategy games *Crusader Kings II* and *Stellaris*, both of which make unusually heavy use of generativity in comparison to other strategy games.

At the same time, many games that are often held out as particularly conducive to player creativity (such as *Minecraft*, to give one example) do not seem to have inspired similar traditions of dialogic retelling of play experiences. Although it is difficult to determine with any confidence that dialogic *Minecraft* retellings are objectively rare relative to the game’s popularity, we can nevertheless hypothesize as to why *Minecraft* retellings seem to be monologic in nature (using *Minecraft* more as a medium to be bent to the storyteller’s will than a creative partner) more often than not. We suggest that, although *Minecraft* makes extensive use of generativity to craft its procedural world, it employs generativity very differently than the games we highlight in this paper. In particular, *Minecraft* employs generativity almost exclusively *reactively* (e.g., by generating more terrain in response to a player who walks to the edge of the already-generated space.) This is unlike the games we highlight in this paper, which tend to employ generativity *proactively* to keep the narrative moving forward and head off writer’s block before it has a chance to set in.

9 CONCLUSIONS

By examining three cases in which players made use of games as storytelling partners to craft dialogic retellings, we found evidence of common design elements between the games used to craft these retellings. We also found that these design elements, taken together, seem to provide assistance to players engaged in creative activity, potentially enabling them to mitigate the effects of or outright circumvent several identified barriers to creativity. These design elements correspond closely to the key features of “gardening games”—a class of generative games recently identified by Kreminski and Wardrip-Fruin—and their presence in a game may help attract players who seek to tell stories based on their play experiences to certain games over others.

It remains to be seen whether the design elements that this paper proposes as conducive to player creativity in the construction of retellings can also be generalized to facilitate other kinds of player creativity. We would like to claim that the barriers to creativity addressed by these design elements are agnostic to the particular creative medium in which the player is working, and therefore that the design elements we highlight should apply equally well to facilitating forms of player creativity that are non-narrative in nature, but in practice, more evidence is needed to support this claim.

9.1 Future Work

Our findings here suggest several potential paths forward. First and foremost, in order to test the effectiveness of the design patterns highlighted in this paper at facilitating player creativity, we intend to construct a game that makes use of these design patterns and evaluate its effectiveness as a storytelling partner.

This paper largely attempted to analyze the design patterns that games use to facilitate creativity from a distance, without talking to the players who created the dialogic retellings we chose to highlight. Going forward, it may be worthwhile to interview players who use games as creative partners about their experiences in order to better understand what appeals to them about the experience of working with the particular games they select.

Finally, by more closely examining individual games that make use of the design patterns described here, we may be able to identify additional patterns that these games use to facilitate player creativity—some of which may not be shared between all of the games examined, but which can nevertheless be incorporated into a wider catalogue of the tools games use to facilitate creative activity by players. One potentially promising pattern found in certain strategy games, including *Crusader Kings II* (which makes use of many of the other patterns discussed here), involves the automatic maintenance of a player-accessible log or timeline of notable game events, which the player can then use as a reference or piece of raw material in their efforts to construct dialogic retellings of their play experiences.

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REFERENCES

- [1] 2019. Dwarf Fortress Stories. Retrieved January 11, 2019 from <http://dfstories.com/all-stories/>
- [2] Robin Burkinshaw. 2009. Alice and Kev. Retrieved January 11, 2019 from <https://aliceandkev.wordpress.com/>
- [3] Robin Burkinshaw. 2009. Selflessness. Retrieved January 11, 2019 from <https://aliceandkev.wordpress.com/2009/06/16/selflessness/>
- [4] Kate Compton and Michael Mateas. 2015. Casual creators. In *International Conference on Computational Creativity*, 228–235.
- [5] Nigel Cross. 1967. *Simulation of Computer Aided Design*. Ph.D. Dissertation. University of Manchester Institute of Science and Technology (UMIST).
- [6] donoteat01. 2018. Power, Politics, & Planning: Episode 2: Urban Freeways. Retrieved January 11, 2019 from <https://www.youtube.com/watch?v=rseaKBPkRPU>
- [7] Mirjam Palosaari Eladhari. 2018. Re-tellings: the fourth layer of narrative as an instrument for critique. In *International Conference on Interactive Digital Storytelling*. Springer, 65–78.
- [8] Brian Eno. 2011. Composers as gardeners. Retrieved January 11, 2019 from https://www.edge.org/conversation/brian_eno-composers-as-gardeners

- [9] Natalie Goldberg. 2005. *Writing Down the Bones: Freeing the Writer Within*. Shambhala, 11–12.
- [10] Max Kreminski and Noah Wardrip-Fruin. 2018. Gardening games: an alternative philosophy of PCG in games. In *PCG Workshop*.
- [11] Anne Lamott. 2007. *Bird by Bird: Some Instructions on Writing and Life*. Knopf Doubleday, 177.
- [12] Brian Phillips. 2008. Pro Vercelli: A Conspiracy So Vast. Retrieved January 11, 2019 from <http://www.runofplay.com/2008/12/08/pro-vercelli-a-conspiracy-so-vast/>
- [13] Brian Phillips. 2009. Pro Vercelli. Retrieved January 11, 2019 from <http://www.runofplay.com/category/vercelli/>
- [14] Ben Samuel. 2016. *Crafting Stories Through Play*. Ph.D. Dissertation. UC Santa Cruz.
- [15] Gillian Smith, Elaine Gan, Alexei Othenin-Girard, and Jim Whitehead. 2011. PCG-based game design: enabling new play experiences through procedural content generation. In *Proceedings of the 2nd International Workshop on Procedural Content Generation in Games*. ACM, 7.
- [16] Kevin Snow, George Kavallines, Thomas Ferkol, and Andi McClure. 2013. Matul Remrit. Retrieved January 11, 2019 from <http://www.bravemule.com/matulremrit/>
- [17] Theodora Vardouli. 2012. Computer of a thousand faces: anthropomorphizations of the computer in design (1965-1975). *Dosya* (2012), 24.
- [18] Bret Victor. 2012. Learnable programming. Retrieved January 11, 2019 from <http://worrydream.com/LearnableProgramming/>
- [19] Noah Wardrip-Fruin. 2009. *Expressive Processing: Digital Fictions, Computer Games, and Software Studies*. MIT Press, 309–310.
- [20] Georgios N Yannakakis, Antonios Liapis, and Constantine Alexopoulos. 2014. Mixed-initiative co-creativity. In *Foundations of Digital Games*.