A Refinement-Based Narrative Model for Escape Games

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Abstract. This paper presents a model for comparing narratives in digital and non-digital escape games. The live-action escape room is a massive industry, but theoretical academic research on the games is lacking. Other forms of the escape game, including point-and-click games and portable escape boxes, are generally understudied. The cross-media genre of escape games has two parallel stories: the backstory embedded in the game's setting, and the player narrative that unfolds during play. These stories can be individually refined to different levels, creating four categories of escape games: puzzle games, thematic games, narrative games, and the newly identified setting-agnostic games. The model demonstrates how existing interactive narrative models can be expanded to include non-digital games, revealing commonalities and differences between escape game formats and illuminating future directions for escape game narratives. This work lays the foundation for future research investigating the relationships between narrative and space in various game formats. Finally, the narrative model has additional applications outside of the escape game genre. It can be used to analyze any interactive narrative's relationship with its fictional space, as well as the relationships between fictional and non-fictional space more broadly.

Keywords: Ontologies · Digital Narratives · Game Design · Analog Games

1 Introduction

In the genre of escape games, players are confined to a limited space and complete challenges that culminate in escape. Although there were earlier text adventure games with a similar format [1], the genre label seems to have been first applied to free point-and-click games produced in Flash. Escape games have now become a massive commercial industry in the form of the live-action escape room. In these analog games, players physically enter a designed space and use their bodies to directly interact with the game's challenges. A 2022 industry report found more than 1900 facilities in United States alone, and an international directory includes many more games [2]. Following the popularization of the escape room, new forms of escape games have emerged. The geenre has been adapted for virtual reality systems and portable formats have been designed to be played in homes and classrooms. Live-action escape rooms have become an increasingly common object of study, with many studies exploring their educational

potential [3–6]. Educational work has been applied to other escape games, such as virtual reality (VR) [7] games and escape boxes [8]. However, escape games, both digital and non-digital, are still understudied by scholars.

Despite industry interest in using escape rooms to tell stories, including an annual convention discussing the relationships between narrative, puzzles, and technology in these games [9], there is little scholarly work examining narrative in escape games. What work exists focuses on a single medium, most often live-action rooms [10, 11] or virtual reality games [7]. Even within the analog categories, however, escape games exhibit various degrees of digital integration. The escape game's proliferation onto a wide variety of digital and non-digital media offers an opportunity to build on existing IDN work exploring how narrative can be implemented within the constraints of specific games media [12–14].

This paper presents a method of categorizing digital and non-digital escape games that places scholarship on interactive storytelling in conversation with existing research on escape game narratives. The archetypal escape game narrative is a tale of escape from the game space. The term "escape room" contains the two crucial elements here: the room, or space, and the process of escape. This paper presents a narrative model for categorizing escape games based on these two components, providing insight not only into the various escape games, but also into the relationship between any interactive narrative and its setting.

2 Interactive Narratives Across Media

Narrative models differ in the media they attempt to cover. As a starting point, Koenitz et al. [15] provide a useful definition of Interactive Digital Narrative (IDN). They distinguish between the possible stories a computational system can generate, or protostory, and the instantiated stories, or products, that result from the interactive process [15]. Although the name itself excludes non-digital interactive narratives, IDN can accommodate non-digital works by expanding the purview of the term "computational system". In search of commonalities between digital and non-digital games, Jesper Juul [16] defines computation as the ways in which game rules are enforced. Non-digital games are computational systems powered by human thought, and therefore can be analyzed through the lens of IDN.

Marie Laure-Ryan's [17] broader view explores the commonalities between IDN and other narrative media. She draws on Aristotelian drama when defining what she calls "type[s] of story" [17]. She contrasts the epic plot, which follows a solitary hero as they perform physical actions to complete a quest, with the dramatic plot, which instead is concerned with the changing relationships between characters. A common structure for the epic plot is the Hero's Journey, which has specific tropes such as traversal of a larger world and a final confrontation with an antagonist [15]. The epic plot, although originating in other media, is commonly seen in video games following structures like the hero's journey [18]. The epic plot's myopic focus upon a single character and their ordeals means the other characters and their relationships are often shallow. The dramatic plot instead foregrounds these relationships and how they change over time.

To these two Aristotelian types, Ryan adds the epistemic plot, which is a combination of two stories. The first occurs before the events of the other, and the later story follows

characters as they uncover those past events. The archetypical form of the epistemic plot is the mystery story. Existing mystery stories have been adapted to games, and there are many original detective games [19]. In interactive epistemic plots, the player often takes on the role of an investigator who needs to piece together past events to solve a mystery. Understanding the backstory is crucial for the player to succeed in the present. All three plots described by Ryan can be applied to both interactive and non-interactive narratives, but it is the epistemic narrative that serves as the foundation for this project's narrative model for escape games due to its emphasis on both space and narrative.

As the term "narrative" has historically been used to study non-interactive story-telling, however, it may carry unwanted connotations if applied wholesale to IDNs like escape games. Koenitz et al. thus warn against relying on story structures originally developed in non-interactive narratives [15]. Rather than attempting to develop frameworks that perfectly encompass narratives in all media, they argue, scholars should acknowledge the specific capabilities of different storytelling media. Some models focus on digital games exclusively, considering the complex interactions between narrative and gameplay that arise when designing computational systems [20]. Another model categorizes the ways in which players can interact with IDNs [21].

Espen Aarseth's narrative theory of games model [22] strikes a good balance between universality and medium-specificity by focusing on both analog and digital interactive media. Narratives in his model, regardless of medium, share four components: world, objects, agents, and events. A fictional world is populated with objects upon which agents can act. Events are moments of action in this world that form a narrative when strung together. Aarseth divides those events into kernels and satellites. Kernels are important events that define the story, whereas satellites are details that can be changed without making the story unrecognizable. These events are directly authored in non-interactive media, but in an IDN, a player may be able to influence satellites, kernels, or both. While Aarseth's theory includes both interactive and non-interactive narratives, his primary focus is on how these components change when interactivity is introduced.

In an interactive narrative, the events that take place are shaped by the player's influence over agents, objects, and the world. Players typically compel an agent to act on objects in the world. Aarseth's "world", hereafter referred to as the gameworld, describes concrete spatial structures that can be navigated by these agents. Such a world can be either physical or virtual extensions of what we might call a fictional universe, which contains all spaces that exist in a fictional reality. Within the gameworld, Aarseth further distinguishes ludic space from extra-ludic space. Ludic space is explicitly navigable by the player, versus extra-ludic space whose structure is modeled but is inaccessible to the player. Aarseth's four components will be considered the building blocks of narrative in the escape game model, but of particular importance is the ways in which the gameworld interacts with narrative.

3   Narrative and Space

Previous research has explored narrative's relationship to space in IDNs, considering how players can inhabit a gameworld and manipulate its objects. Studies of immersion and presence have been conducted both for virtual reality experiences [23] and analog

games [24]. Hameed's and Perkis' theory [25] seeks to explain how players may feel immersed and present within a narrative space from an interdisciplinary perspective. Other research emphasizes the role of objects in storytelling. Echeverri and Wei describe "tangible storytelling", a IDN method that expresses its narrative through digital content mapped to physical space and objects [26]. Their project demonstrates that IDN theories can be applied to hybridized spaces that include both digital and non-digital components.

Ryan and Foote's study [27] analyzes several relationships between narrative and space. They examine how "narrative spaces," the settings in which a story takes place, are used in both static and interactive narratives [27]. The space occupied by the audience's bodies is the contextual space, which may or may not be the same as the narrative space. Ryan and Foote make a further distinction between the concepts of space and place. Space refers to physical properties of an environment, such as "location, position, arrangement, distance, direction, orientation, and movement" [27]. Space becomes a place when it has been shaped by human intervention. A gameworld has spatial properties, but not all parts of the gameworld are places. Fictional places have a history, shaped by past agents.

The history of a place can be revealed through traces of past events. The way a theatre set is arranged, its *mise-en-scene*, can tell the audience things about the characters who act within that space. In what Henry Jenkins calls "environmental storytelling," spaces can contribute to stories through their spatial arrangement, the objects that are included, and how those objects are positioned [28]. In his "embedded narratives", ones that use environmental storytelling, the gameworld and its objects are infused with narrative meaning through careful curation and arrangement [28]. The spaces have traces of human activity that indicate that activity to the present observer. Both professional narrative designers and scholars [29] are interested in the uses of environmental storytelling in traditional digital games. Environmental storytelling has also been applied to other games media, such as virtual reality games [30] and live-action experiences including escape rooms [31]. Environmental storytelling is especially useful for epistemic narratives. In an interactive epistemic plot, interactors "enact their narrative curiosity through the navigation of fixed narrative fragments of an unchangeable event" [19]. The plot requires the player to read into the properties of a place to determine past events within that place.

4   Escape Game Narratives

We may now use these frameworks to understand how escape games present narratives using their world, objects, agents, and events. Escape games are a cross-media genre of games that typically require players to complete a series of challenges within a specific space, using the objects within that space [10, 32–34].

I have previously distinguished between four subgenres of escape games based on the ways in which players relate to the game's objects: live-action, point-and-click, virtual reality, and tabletop escape games. [32]. I now prefer the term "escape boxes" [8] rather than "tabletop escape games" to describe tangible games that are not designed to be played in a specific physical space, including but not limited to tabletop games. A narrative framework for escape games would need to include each of these sub-genres, both digital and non-digital, but this distinction is increasingly blurred. Shawn Fischtein's [35] generational taxonomy describes the degree to which digital technology

is embedded within a live-action escape game. The most advanced Generation 4 rooms use digital sensors and computing software to automate game processes and enable new kinds of challenges. Even analog escape boxes may include digital elements. The *Unlock!* [36, 37] series of card games requires a mobile app to play. As the game's physical components include only cards, along with other paper objects, the app allows for challenges that those components do not afford.

Nicholson [10] builds on Fisctein's taxonomy with a four-stage "generational model" for narrative in escape rooms. In puzzle rooms, the focus is entirely on solving a series of puzzles – there is no specific setting, and the player takes on only the role of puzzle-solver. In the next stage, thematic rooms, the narrative is a story of escape from a specific place, like a prison. In the following generation, narrative rooms, players have defined diegetic roles and follow a quest-based structure toward a narrative resolution. Nicholson's final stage, hypernarrative rooms, may be a future direction for the industry. These games have not a single definitive narrative but instead branch based on player choices. Nicholson's framework is designed specifically for live-action escape rooms but can be applied to the broader genre of escape games by integrating it with Ryan's epistemic plot, Aarseth's theory of narrative games, and scholarship on space and narrative.

5   Refinement in Escape Game Narratives

Consider the two juxtaposed stories in Ryan's epistemic plot: the immutable backstory and the interactive story in the present. Although not every escape game's narrative is explicitly an epistemic plot, these elements are still present. The backstory is a narrative embedded in the game's space, while the player narrative unravels during play. The degree to which an escape game refines each of these stories drives the narrative experience of the game. Refinement, as described by Wardrip-Fruin, is a process through which an abstract concept becomes specific and concrete [38]. It is not a binary operation, but one with several stopping points. The backstory and player narrative can to an extent be refined individually, and each to varying degrees. Thus, we can create a model that categorizes escape games on two axes:

Escape games can be compared with one another based on the processes of *setting refinement* and *player narrative refinement*. These processes may occur individually or in tandem, resulting in games with strikingly different narrative experiences. This approach contextualizes Nicholson's generational categories and expands his model to include more forms of escape games, including a new category.

A puzzle game makes no attempt at refinement of either the setting or the player narrative. The players are in a generic room, and the narrative is that they must escape from that room for no other reason than the fact that it is an escape game. A thematic game is one in which the game's setting is defined but the game's narrative is comparatively vague. These games' settings fit within a particular type of space (pyramid, tomb, prison, etc.) but the narrative is simply escaping from that space. Narrative games feature both refined settings and refined player narratives. Players act within a defined world according to their roles and narrative goals.

Setting-agnostic games are a new category illuminated by this model. These games may give players roles and a clear objective to work toward, but the setting itself is not
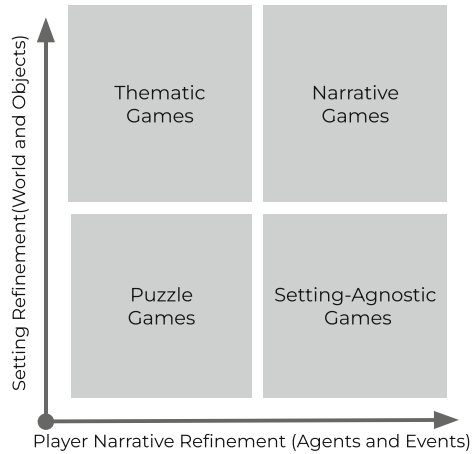
Fig. 1. A refinement-based model for escape game narratives.

especially important. *Escape Room in a Box: The Werewolf Experiment* [39], acknowledges that the game may be played in any setting. The box itself is framed as a diegetic package that upon opening releases a deadly toxin into the players' contextual space. The players must then complete challenges to retrieve the antidote. While each category in the model may appear to be monolithic, detailing the processes of refinement will illuminate the variations within the quadrants.

5.1 Setting Refinement

In an abstract sense, an escape game occurs in a room. Through refinement, that room shifts from space to a defined place. Both Nicholson and Hanssen et al. have previously used Henry Jenkins' narrative architecture to explore how a live-action escape room's space can contribute to a game's backstory [10, 11]. This paper further develops how backstory is expressed to the players through Aarseth's world and object components.

Moving along the world refinement axis requires supplying information that helps players interpret the gameworld. Contrary to the binary quadrants in the diagram, world refinement has at least two steps. Using genre conventions, the world can be refined to a category of place such as a bedroom, office, or bank vault. In this way, the setting becomes what Jenkins calls an "evocative space," one that relies on outside knowledge to contextualize itself [11, 28]. Such a place can be defined further by contextualizing that place in a broader geographic and temporal continuity. Setting refinement can occur in at least two ways: through the objects and the gameworld.

Refinement Through Objects. Objects in escape games act as signs that refine the game's setting. Fernández-Vara [40] builds on Jenkins' concept of environmental storytelling using Peirce's semiotic model. She describes how icons and signs communicate information to the player. The "Labyrinths of Egypt" level in the video game *Escape Simulator* [41] is marked with decontextualized hieroglyphs and sphinxes that convey a vague exoticist "Egyptness". Using icons and signs helps develop space into a more

specific place by using markers with which the audience is assumedly familiar. One step of refinement is establishing the game's setting as a place that belongs to a particular category. The presence of cobwebs might evoke the concept of "haunted house," along with its associated cultural conventions. In these games, objects prompt players to interpret their surroundings as what Jenkins calls an "evocative space," which relies on outside knowledge of similar spaces to characterize itself [28]. The creators of the escape game *Sister Jill* reference evocative spaces to describe how their game's setting draws on genre conventions of horror movies to characterize their space as an unsettling church [11].

Objects can be used to go a step further. The third type of Peircean sign, the index, can make a game's sense of place more specific by implying past activity [40]. Hansson et al. differentiate between prospective objects which are used as clues during the escape room, and retrospective objects that act as fragments for the game's embedded narrative [11]. Retrospective objects serve as traces of activity in the fictional past of the game world. The selection of books on a shelf, for example, may invite the player to consider what kind of person curated that collection and why. These objects provide information that players can use to reconstruct the past actions taken by agents in the gameworld. Learning about the haunted house's tormented inhabitants through indices invites players to turn the game's setting into place. Through the players' interpretation of past events, a generic haunted house can become an inhabited place.

As creating place is a process of interpretation, the legibility of signs is important to setting refinement. The markers of a kind of place will be legible to some players and not to others. The way two people experience the same place, then, may be quite different. McDowell and Nicholson provide guidelines for reducing the "cultural bias" that limits an escape game's legibility and accessibility to players outside of the expected audience [42]. They provide guidelines for reducing ambiguity for players outside of the target audience. However, that does not mean designers cannot use signs from their locality. The design of some live-action escape rooms have been influenced by objects from the local region, such as Ameli's Roman cistern escape room [43]. These games take advantage of their physical location to tell local stories.

Refinement Through the Fictional Universe. The ludic gameworld is not the only way to refine a game's setting. Like Aarseth, Nicholson distinguishes between the accessible parts of a gameworld and the fictional universe [10, 22]. Information both inside and outside the room can contribute to the players' understanding of the gameworld and its place in its universe. Escape games take place in a small slice of a larger fictional universe, and defining that universe refines the setting. Before players see any of the game's objects, the process of creating place has already begun.

The game's name sets the stage. Some names refine the game's setting to only the broad categorical level, such as The Escape Game: Orlando's room *Prison Break* [44]. Others are more specific. The Great Escape Room's *Poker Night at the President's Bunker* [45] implies both the place's owner and perhaps a history of events that have taken place in the game's space. Paratexts like marketing descriptions also provide material for interpretation. *President's Bunker*'s description reads: "You must work together in a 60-min, high-stakes race to prevent nuclear Armageddon" [45]. This example addresses the universe outside of the gameworld, which is under threat of nuclear war, Nicholson

identifies other factors like "customer service and the elements of the lobby" that can contribute to setting refinement [10]. The place that players create upon entering an escape game is thus pre-shaped by a myriad of texts and experiences surrounding the game.

The broad world of an escape game's setting might also be known by the players prior to playing the game. Escape games that are transmedia extensions of existing franchises may borrow the visual language of that franchise. Paul Booth describes how the *Doctor Who Experience*, a branded escape room, includes in-universe objects familiar to *Doctor Who* fans, such as the "iconic scarf" belonging to the Fourth Doctor [46]. As the successful communication of placeness in these cases relies on these past experiences, however, the signs may be interpreted entirely differently by non-fans.

Spatial properties of the gameworld itself also communicate information. The dimensions and shape of a room's layout may resemble places the player recognizes, such as a western saloon or a bank vault. Implications of events and areas outside of the gameworld can also expand the player's understanding of the fictional world. Nicholson describes how a telephone without a dial tone in the escape room, accompanied by a note suggesting that a nearby explosion cut the phone line, could develop places outside of the room [10]. The gameworld becomes more specific by defining its relationship to the rest of the fictional universe.

5.2 Player Narrative Refinement

As the player narrative is the series of events that the players experience during the game, even the most simplistic puzzle rooms have a narrative. This is a narrative only in the most abstract sense. The typical escape game narrative is a barebones epic plot: there is a room, and players must escape from it. In his 2015 survey of escape room facilities, only 16% of respondents had abstract rooms in which escaping the room is the only narrative goal [47]. We can categorize these as simple epic plots. The point-and-click game's solitary hero takes physical action, completing several tests and then being rewarded through escape. Refining the player narrative means imbuing these story beats with meaning. Like setting refinement, player narrative refinement begins with vague ideas, continues into genre-level refinement, and ends with a more specific narrative. Nicholson [10] invites designers to "ask why" the players must complete each challenge, and answering this question using the game's events and agents refines the player narrative.

Refinement Through Events. Each challenge the players overcome constitutes an event in the player narrative. The basic kernels of these stories include the players entering a space, completing challenges, and ultimately exiting the space. These events are given narrative meaning through framing and structure.

One method of refining the player narrative is by framing it within a fictional genre that may replace these generic kernels with more specific ones. Nicholson argues that establishing a fictional genre sets player expectations for what they will have to do in the room [10]. Framing the narrative within a genre provides the game's kernels with basic meaning. Genres identified by Nicholson's 2015 survey respondents [47] include "be[ing] an adventurer" (4%), conducting a heist (4%), and carrying out a military operation (2%). Perhaps unintuitively, escape is not always the primary narrative goal.

In Nicholson's sample, 30% of the games did not include escaping the room as part of its narrative [47]. As "escape" is only one of many possible narratives to refine the generic epic plot, designers are stretching the limits of the "escape" genre label itself.

Leading up to the game's narrative goal, the sequence of challenges determines the story's pacing and narrative structure. In Nicholson's model, advancing from a thematic room to a narrative room requires the implementation of a quest-based structure. This structure requires the interplay of game design and narrative design. The players complete a series of increasingly difficult challenges that culminate in a dramatic climax, following the dramatic arc. This structure satisfies basics of both game design and narrative; scaling difficulty is typical in video games, and the Western narrative arc is common in storytelling.

Positioning the typical Western narrative structure as the most "refined," however, incorrectly imply that other structures are inferior [15]. Other structures may be more appropriate in certain contexts. Epistemic plots were also common in Nicholson's survey: 9% of games had players investigating a crime or mystery, 5% solving a murder, and 4% gathering intelligence or espionage [47]. Other than the open structure, in which all content is accessible from the beginning, the structures Nicholson [47] identifies follow what Gasque et al. refer to as a "gated story structure" [19]. Challenges and narrative fragments are not available until previous challenges have been completed. The gradual discovery of past events is central to the epistemic plot, and a gated structure controls when revelations occur. Escape games also need not adhere to Western conceptions of narrative. Koenitz et al. [15] provide several story structures from beyond the Western literary tradition that could be applied in future escape games.

Refinement Through Agents. Defining the role of the player is key to providing narrative context for the story's kernels. As agents, the players drive the progression of the player story. In digital games, players typically take on the role of an avatar to act in the story, but the relationship between the player and the avatar can differ across forms of escape game. Nicholson claims that in live-action escape rooms, the player and the avatar are one and the same [10]. Players might play as themselves, or as a generic captive or adventurer. Similarly, point-and-click escape games similarly do not include much information about the player character. Some games like Takagi's *Crimson Room* [48] include a bit of first-person narration as they explore the room, but even in those cases the character's traits are not well defined. These characters resemble the unnamed protagonists of some adventure games in their lack of age, face, gender, or race [49].

The player's role as an agent can first be refined to an archetype. Players might take on roles such as detectives, robbers, adventurers, and other archetypes directly pertaining to the goal of the room. The player's role as a spy in the VR *I Expect You To Die 2* [50] drives that game's events, requiring players to disguise themselves and complete challenges such as protecting a prime minister during a theater show. In scriptwelder's point-and-click *Don't Escape* [51], the player takes on the role of a werewolf who must securely lock themselves within a room before they transform and destroy a nearby village Non-live-action escape games can cast the player as an agent whose body does not match their own. In VR game *A Fisherman's Tale* [52], players take on the role of a small puppet who can change sizes to explore a surreal lighthouse. The protagonist

of point-and-click *A Ruff Day* [53] is a dog who wants to go outside for a nap. These examples demonstrate that refinement in escape games is influenced by the medium.

The player's role may also be refined into a more established character. The short duration of the games can make it difficult to develop these characters, however. In one solution, transmedia extensions of existing franchises can draw on outside information for defining their characters. Card game *Unlock! The Adventurers of Oz* [54], for example, casts the players as the protagonists in L. Frank Baum's *The Wonderful Wizard of Oz* [55]. Like branded escape rooms that rely on players' understanding of the fictional world from related media, the characterization of these protagonists occurs primarily outside of the game.

Including agents other than the players can also add depth to the narrative, but this too differs across media. Escape games often do not include active characters beyond the players' avatar. When present, however, non-playable agents can be placed on their own spectrum of refinement. Aarseth distinguishes between generic bots with no individuality, shallow characters who have identities but simple personalities, and fleshed-out deep characters [22]. VR escape game *I Expect You to Die* [56] includes named allies that provide context for the mission, such as the player's handler, and antagonists like assassins, who have no individual identities. These characters are still limited by their programming, however. In live-action rooms, non-playable agents may be played by staff members that can react to player behavior more organically than current AI NPCs [34]. Similar to Aarseth's categorization of digital non-playable agents, Donley uses the categories of "observers," "bit characters," and "key characters" to describe the degrees to which these live-action agents are developed as characters and to which they are integrated into the narrative. Key characters, especially, can add emotional depth to a narrative. In a time-travel themed room Donley describes, players interact frequently with an actor playing a pop star. As "[t]he central narrative of the game was built around the pop star and their seemingly inevitable doom," attempting to save the character as they repeatedly face death may provoke an emotional attachment from the players [34].

6 The Future of Escape Game Narratives

As the settings and narratives of escape games continue to change, this model will still provide valuable insight. The range of stories told in escape games can expand by refining to unusual settings and player narratives. Wardrip-Fruin [38] sees a vast expansion of the topics video games are about as new tools have made games more accessible to create and easier to distribute. Escape games might take what he calls an alternative approach, which takes familiar game actions and places them in an uncommon domain.

An alternative approach may address Sawyer Kemp's [57] critique of patterns in live-action escape room narratives. Kemp argues that the prevalence of games set in prisons or life-threatening scenarios shows a tendency toward tragic, masochistic stories. They suggest that escape rooms tend toward "masculine endings," in the words of escape room designers they interviewed. Although the typical story tends toward "masculine endings" and settings, Kemp argues that escape games can tell stories that are neither tragic nor based around entrapment. They point to Aviki Games' *Escape the Dressing Room* [58], in which players play as actors who have a limited time to get dressed up

and ready for their performance [57]. As "escape" as a narrative becomes less important in the live-action escape game space, new possibilities emerge. Escape games might also be used for social critique. Risa Puno's *The Privilege of Escape* [59] was an escape room art installation that attempted to explain social privilege using its mechanics. As two groups solved the same set of puzzles in parallel, one group had arbitrary rules constraining their actions that made it more difficult to complete the challenges [60].

The escape game structure may also change drastically. Nicholson is concerned with the replayability of live-action escape rooms [10]. Both the backstory and the kernels of the player narrative are static in the typically linear escape game. Additionally, facing the same puzzles for a second playthrough can be trivial. Live-action escape rooms are expensive to create and change, so if each player can only play each game once, escape rooms need a constant influx of new players to remain profitable.

Nicholson suggests the branching narratives of hypernarrative rooms as a possible solution to the linearity of escape games. Escape games with variable narratives do exist. *Unlock! The Adventurers of Oz* [54] ends with a choice that determines the ending, and even includes optional side content as variable satellites between playthroughs. These games require the creation of more content than a player will see in one play. In IDN terms, the protostory of the room must expand. This structure has implications for both the setting and player narrative of escape games.

As the player narrative is told through the sequence of challenges, the challenges themselves will have to change between playthroughs. Nicholson points to artificial intelligence technology that generates new puzzles every time as a potential solution. IDN research projects demonstrate methods for procedurally generating puzzles that integrate with a game's narrative [61]. A system like Fernández-Vara and Thomson's puzzle-dice system, designed specifically for adventure game puzzles, may be used to make an escape game's challenges unique to each playthrough [62].

Space could play a major role in branching escape games. Chris Hales describes how Cincera's interactive cinema piece *Cinelabyrinth*, set in a physical labyrinth, asks the audience to make choices by physically following the path corresponding to their decision [63]. This approach is a physical manifestation of what Murray and Salter call spatial mapping, a visualization of IDN that relies on the physical relationships between parts of the gameworld [64]. An escape game might include branching in its narrative through selectively extending the game's ludic space. The setting might also change over multiple playthroughs. Fernández-Vara suggests that indexical storytelling can provide new ways for players to engage with interactive narratives. Rather than only interpreting the signs included by the game's designers, players might be able to leave their own indices. Live-action escape game players leave traces like opened locked and drawers, but these are reset for the next group [11]. What kind of stories might be told using escape games that do not reset?

This paper's model also suggests new narrative directions for future games. Escape games might take on less common narrative structures. This paper, and Western narrative theory as a whole, has relied heavily on Aristotelian dramatic arcs for plot analysis, but other structures may be used [25]. Games could also be designed around the concept of replay, considering what the player experience might be like on subsequent playthroughs [65]. In a time-travel story, for example, the narrative structure could incorporate the

actions of time-travelers over multiple playthroughs into one extended player narrative. Generative research may also be useful in generating escape game spaces. Existing projects present implementations of systems that generate gameworlds and populate those spaces with environmental storytelling objects [29, 66]. As escape games change, designers will still need to consider the refinement of the game's setting and narrative. Procedural generation requires careful consideration when designing the generator as that will influence the output. Generating settings and puzzles with separate systems may fail to produce consistency between them.

7 Future Work

This project applies theories from IDN to expand knowledge of the understudied escape game genre. Placing differently mediated escape games in direct comparison rather than in a generational model avoids the historiographical pitfalls of an evolutionary framing. Escape game history narratives [67, 68] tend to position the point-and-click games as a mere predecessor to the live-action games, but these games continue to be made and played. It also advocates for consideration of escape boxes and VR escape games, which are understudied in comparison to the live-action games. Future work on space and place in escape games can build on this framework by considering issues like immersion, presence, and embodiment. Its introduction of setting-agnostic games also invites analyses of the relationships between fictional and non-fictional settings. How might games recontextualize the spaces in which they are played?

This formal framework can also be a foundation for critical research. For live-action games, future work should consider more closely the relationship between the game's fictional space and its physical location. Silva [69] describes an inequitable spatial participation gap occurring in games that take place in existing spaces. Similar bias might occur in the case of geographically located live-action escape rooms. Stuit describes the experience of playing *Prison Escape*, which takes place in a former prison [70]. The fictional backstory of the escape game's place intertwines uncomfortably with the actual history of the game's building. Non-escape VR experiences counter similar ethical concerns when using real-life places [71, 72].

The refinement-based narrative model for escape games contributes to our understanding of storytelling across games media. Continuing to examine analog games and live-action entertainment in conjunction with digital games may provide insights for IDN. The model can also be used to analyze and design games outside of the escape genre. The "escape room" label becomes less descriptive as games present new narrative goals and format, but the relationship between other interactive narratives and their respective settings may be analyzed through this lens.

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