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Surveying VR storytelling: Investigating key terminology and the role of the procedural author

Abstract:

Current discussions around virtual reality (VR) storytelling have surged in the last few years, along with the growth of virtual reality technology and content. There is a focus on differentiating and defining this medium by discussing the immersive, interactive qualities that give it new ways to tell stories. Questions circle around what it means when audiences are 'present' in the narrative and how this creates a desire to have agency. I argue these terms – immersion, presence, interactivity, and agency – can be afforded more nuance as they are often used to discuss two different yet interconnected aspects of telling stories with technology: the technology itself and narrative techniques. In an attempt to understand how to tell stories with VR, I have discussed the terms immersion, presence, interactivity and agency from a technology perspective and a narrative perspective. I discuss the translation of literary techniques to VR narratives to demonstrate how storytellers can alter the way audiences are immersed, have agency and feel present and can interact in digital narratives.

Biographical note:

Brooke Maggs is a freelance narrative designer and writer of games, fiction and VR and regularly consults on digital and live narrative experiences. She is the narrative designer for games such as *The Gardens Between* and *Paperbark* and has received the XBOX Women in Games Creative Impact award for her work. Her research focuses on creative writing practice and the links between digital literature and traditional literature.

Keywords:

Creative Writing – Creative practice – Procedural author – Virtual reality storytelling – Immersion – Presence – Interactivity – Agency

Introduction

As a narrative designer and writer of fiction, games, and virtual reality (VR), I am interested in the current conversation around storytelling in VR. In the last few years, these conversations have surged along with the growth of virtual reality technology, platforms, and content. There is a focus on VR's ability to tell stories in new ways due to its unique immersive, interactive qualities. The 'reader' is now physically present within the narrative world, seeding discussions around what this means for storytelling (Gajsek 2016). Key to these conversations are the terms interactivity, immersion, presence and agency, which are used to emphasise how VR is different to other media. Eric Darnell and Claudia Southmartin of Baobab Studios recently stated, 'You feel and do things in VR that you just don't do in movies and games' (Darnell & Southmartin 2017) and Jeff Brown of Oculus Story Studio has said: 'What sets VR apart is the feeling of being present' (Brown 2015). But these concepts are not new to storytelling or technology.

When these terms are used to differentiate VR as a medium, they become privileged ideals and, as terms, lack nuance to speak technically and specifically about the technology and the craft of storytelling. This is because they are used to sweep over two important (and interconnected) aspects of telling stories with technology: the technology itself and narrative techniques. VR narratives are often created in development teams that consist of technical and artistic people. Immersion, presence, interactivity and agency can be used describe the technology and human responses to it, independent of narrative. These terms also have their own meanings in the realm of creating and responding to art and literature. In discussions of narrative and VR, I have noticed immersion, interactivity, agency and presence are used too generally to provide specific insights into either the technology or the stories we tell with it. To survey VR storytelling then, I will investigate immersion, presence, interactive and agency as they relate to technology and to narrative with the intention of identifying how best to work with the technology, and development teams, as a storyteller.

To investigate immersion and presence in technology, I refer to computer scientist Mel Slater (2009), who views immersion as an effect of technology and uses the concept of place illusion to describe being present in a digital space. To consider the various ways we can be immersed in narrative, digital theorist Marie-Laure Ryan (2015) traces the 'text as world' metaphor in philosophy, as it is relevant for mapping a poetics of immersion. Notions of being immersed and present in both technology and narrative find their intersection at the body, which perceives sensorially and engages mentally, via the imagination. Presence, or feeling present in a story, can be influenced by how we position players physically and socially in the world, which influences the information they import. I will consider what narrative techniques can work to create a sense of 'presence' for a VR audience using *The Turning Forest* (2016) as a case study.

Interactivity in virtual reality is also located at the body, as input is closer to natural body movement (the turning of our heads and moving of our hands). Players can interact with a system, independent of narrative, and experience agency when they have the ability to make meaningful actions and see their results in the system. To show how interactivity and agency relate to narrative, I will return to Ryan (2015), who uses the

'text as game' metaphor to consider how audiences participate in the construction of a text and derive a sense of dramatic agency when their performance is recognised by the narrative.

Immersion and presence: in technology

Virtual reality can be experienced on a number of different platforms and devices, ranging from mobile phones to game consoles to personal computers. It is a medium generated by computers and therefore, in this context, 'immersion' has been used by computer scientists, such as Mel Slater (2009) to speak of the technological capabilities of the system. Slater (2009) is clear in saying 'immersion' is not used to speak of human experiences or responses to the system but the system itself. From this perspective, more advanced technology allows for higher fidelity creations, which increases its immersion. Aspects of the system that influence its level of fidelity include display resolution, the ability of the system to track the body (such as head and eye movements), and the quality of the audio. Immersion is 'a property of the valid actions that are possible within the system' (Slater 2009) and is defined by the number of ways the technology can track input and interaction (which I will discuss in the next section). The more ways of tracking, the more immersive it is.

Problems arise when VR is declared to be 'more immersive' than other media, as levels of immersion differ widely between the devices within its own realm. The Google Daydream, a piece of VR technology on mobile phones uses one palm-sized controller for interaction, whereas the HTC Vive, a VR headset allows for room-scale experiences with two, multi-button controllers. The term 'immersion' is further complicated when it is used to describe a game or experience as being 'more immersive' than other games or experiences, when it appears on different VR platforms and therefore may have different input tracking capabilities.

A system that supports more ways to approximate physical reality and track interactions can increase the likelihood that we feel 'present' within it. The term 'presence', or 'telepresence', was brought to virtual reality in the 1980s from robotics as a way to describe how an operator felt present with a robot when operating it remotely. Due to this origin, Slater proposes the term 'place illusion' to differentiate it, and describe telepresence in relation to virtual realities. For him, place illusion is 'the strong illusion of being in a place in spite of the sure knowledge that you are not there' and further describes it as 'a human reaction to immersion' (Slater 2009), or an immersive system. Slater is quick to highlight that immersion and place illusion (or 'presence') relate to the form, not the content (like the narrative). He believes place illusion 'arises from the interplay between the human sensing and motor action systems and the immersive system' (Slater 2009) or VR technology. It is therefore not reliant on our assessment of the content (if a character is good or not) or involvement in the content (spatially, emotionally, or in the unfolding of narrative events) of the virtual world. It is solely reliant on the computational power and fidelity of the technology, the hardware and software.

To craft stories with technology, storytellers must consider its capabilities. They can consider how the audience will be able to interact (with a single controller? full body

movement?) and in what circumstances they are experiencing the story (on their phone? standing in their living room?). They can also consider what the technology allows the player to sense, how they can alter the level of sensing (turning their head in a VR experience, for example) and how players can modify the system (like picking up objects). This being the case, it is natural for discussions about VR to focus on these unique characteristics of the technology and which platform the project is being developed for. The terms 'immersion' and 'presence' can quickly cross over into the realm of narrative, as they have their own meanings there, and so it can be helpful to adopt Slater's terms and use 'place illusion' for presence, and 'fidelity' to consider the many input capabilities – though it is difficult to draw concise differentiations when the terms have their own places in different realms and therefore it is important to understand how they are used in each. This way, the storyteller and development team can determine their own in-house language as necessary for their projects.

Immersion and presence: in narrative

There are many ways we may be immersed and present when experiencing narrative, and these topics have been explored extensively in the study of literature. It is easy to confuse these terms across technology and narrative as when we are experiencing virtual reality, we are in a virtual world and a storyworld, making us 'doubly immersed'. In her book, *Narrative as Virtual Reality 2*, Marie-Laure Ryan (2015) constructs a poetics of immersion by using the 'text as world' metaphor as it is found in literary criticism. This is only one metaphor among many others to describe texts and our reading of them. The 'text as world' metaphor is relevant for my research as it indicates there is an expanse – something to be immersed within – and therefore allows an investigation into what it means to be 'immersed' in a narrative text. If the text is a game without a narrative, players may also be immersed in the actions of the gameplay (and I have briefly covered this in the next section).

The idea of the narrative text being a 'world' is the position that the function of language is distinct from an extralinguistic realm (such as a storyworld). This approach understands language as vertical where it is traversed toward referents. Sentences are linguistic, but the referents or 'states of affairs' they refer to are independent of language because they are in the textual world. Ryan (2015) explains:

> To speak of a textual world presupposes that the reader constructs in imagination a set of language-independent objects, using as a guide, the textual declarations but building this always incomplete image into a more vivid representation through the import of information provided by internalized cognitive models, inferential mechanisms, real-life experience, and cultural knowledge in this activity is to[...] conjure their presence to the imagination (Ryan 2015: 63).

In theories that conceive of the text as a world, readers are experiencing complete narratives that are considered closed or limited in their interpretations. When reading a book, we are suspending disbelief, accepting illusion, and exploring. Readers are active in their imagination as they are interpreting the characters, plot and setting based on their own real-world logic.

Cognitive psychology has provided ways for this building and imagining to be understood, due to there being certain amount of immersion naturally built into language and cognitive schemas. Ryan draws on Keith Oatley's (1999) work, which proposes the psychological concept of mental simulation. In his research, Oatley (1999) states that fiction 'runs in the minds of readers just as computer simulation runs on computers' (Oatley 1999: 101); however, this running of the program requires mental effort to reach. Imagining is therefore a conscious act. The role of the storyteller is in creating the narrative and considering both the 'divergences and relative similarities of interpretations' of the readers. As Ryan states, the goal is for the reader to conjure the presence of the characters, plot and setting, and therefore feel as though they exist (Ryan 2015: 79).

In narrative, the term 'presence' derives from discussions around experiencing art, and how this experience is inherently caught up in the position of the body (of the audience). Paintings use a visual language that position the viewer in relation to a scene or figure. In literature, narrative devices such as present tense 'create a simulacrum of real-time "life"' which has the effect of pulling 'the reader from the now of the storytelling act to the now of the storytelling world' (Ryan 2015: 98). This is relevant to VR experiences as we may employ narrative techniques to position the audience in the world by considering the prior experiences or schemas the audience bring to the experience.

One of the key ways we can influence the social schema the audience imports is by how we position them physically in the narrative world. In their research, experience designers, Katy Newton and Karin Soukup (2016), investigated how audiences in VR perceive their role in the storyworld, and how position and engagement impacted story interpretation. To do this, they used low-fidelity, analogue technology – cardboard 'headsets' – and placed the participant in life-like scenes and locations from Paisley Smith's VR documentary, *Taro's World*, which explores the death of her brother. One of these scenes was a classroom and the participant was seated in the front row. The goal of the scene was to observe the main character, Taro. What Newton and Soukup found instead was participants felt the need to pay attention to the teacher: 'Based only on the environment and their position within it, participants took on the social script of "student"' (Newton & Soukup 2016). This shows we may use common social schema from the real world and account for the relative similarities and differences Ryan spoke of when designing stories for VR.

Different narrative techniques can alter the ways the audience may be immersed (spatio-temporally, socially and emotionally) in narrative according to how they are positioned or present in the narrative world. Understanding different types of narrative immersion gives nuance to how we speak of telling stories in VR and avoids generalisations that propose stories in VR are more immersive and provoke a stronger sense of presence than other media. In literature, the narrative technique of altering the audience's proximity to the narrator alters their spatio-temporal immersion in the narrative, which is when the 'imaginative distance between the position of narrator and addressee and the time and place of the narrated events' (Ryan 2015: 93) is reduced to zero. Literary devices used to create this effect include sensory description of the scene, perspectives of characters (interior and exterior), first-person narration, and dialogue. For example, when description is linked to character action, there is room for the reader to identify

with characters' bodies as they are seeing what they see, doing what they do. Ryan (2015: 94) argues there is a 'fusing [of] the consciousness of the reader and narrator into the same act of perception' making the reader's virtual body active in the scene. This is because it is associated with other characters' bodies and action; therefore, the reader 'is no longer a passive observer but emulates (or simulates) ... from a first person enactive perspective' (Ryan 2016: 95) the story as it unfolds.

These literary devices can also be applied to VR storytelling. In *The Turning Forest* (VRTOV 2016), a VR fairy tale, the main character, Nathan, tells a childhood story about playing in the forest with his friend, Amelia. When she goes missing, he searches for her and encounters a fantastical creature. Sensory descriptions from Nathan, the narrator, work to position the audience in the scene. He describes the trees which 'constantly shed copper coloured leaves' and he notes there is 'always a chill in the air' (VRTOV 2016). Players can see a beautiful forest and leaves falling in the headset, but they are also encouraged to imagine or *simulate* the cold air of the storyworld, creating a sense of being present in the storyworld. When a fantastical creature leaps from the forest and stands before Nathan, he says, 'I faced it, looked at its gigantic, black, saucer-shaped eyes' (VRTOV 2016), cueing players into the action Nathan performed. Though this is not to say the audience will look, it is a narrative technique to increase the likelihood that they will engage with the narrative.

In VR, the audience can also be socially immersed, that is, included in the social rules and malaise of the narrative. A narrative technique unique to VR is to have characters recognise and respond to the audience creating a sense of being socially immersed (another form of immersion), and of being present (as a social being) in the narrative. When characters make eye-contact with the audience, social rules in the real world to the virtual world begin to match. Rob Morgan (2015), AR and VR writer and designer, states, 'presence is in part a social thing, it's about interpersonal relationships and that puts it in the realm of story and narrative'. Social interaction confirms the player's presence in the storyworld and provides information about their role and identity. When designing story for VR, Morgan (2015) has noticed when players see another character, they immediately get right up close and invade the character's personal space. They are investigating and testing social rules. Morgan (2015) argues that if storytellers can account for the common ways players try to test these the rules of the storyworld (with a few lines dialogue from character, for example) then it immediately makes the storyworld more realistic. He claims this is more effective for immersion than high fidelity technology, because it can create and reinforce social rules and emotional relationships.

Emotional immersion, as another way we may be immersed in story, has been widely discussed in VR discussions around storytelling. It is specifically used to differentiate the medium by claiming it has a capacity for higher emotional immersion than other media. This proclamation was intensified and crystallised in the industry by a TED Talk by Chris Milk (2015), a VR filmmaker, where he called VR the next 'empathy machine' after film. In this talk, Milk presents his project, *Clouds Over Sidra* (2015), developed with the United Nations, which depicts the experience of a twelve-year-old girl living in a refugee camp. He notes that 'you're sitting on the same ground that she's sitting on...you feel her humanity in a deeper way...you empathize with her…' (Milk 2015).

He believes VR has the capacity to allow audiences to be more compassionate. I argue using the term as a defining feature of the medium means it loses its potential to speak of the many ways may be emotionally immersed in a text. Emotional engagement is not new in narrative, but the way it is evoked across media with certain narrative techniques can be different.

Other ways we may be emotionally immersed include self-centred emotions (fear, disgust), which are 'inextricably tied to a sense of presence' (Ryan 2015: 110) and are more prevalent in visual media. In my case with *The Turning Forest*, I felt present in the fairy tale forest through my delight at looking at a beautiful, fantastical creature. Other kinds of emotional immersion include subjective reactions to characters and the way audiences make judgements about the behaviour, desires, or beliefs of characters. All of these modes of emotional immersion are available to the VR storyteller. Knowing these dimensions of emotional immersion allows storytellers and developers to speak of the play experience in the studio. They can accurately describe how they would like players to feel: to empathise with characters, to disagree with them, or to be frightened or delighted by the world. With this nuance, we see it is the worlds, characters, and situations that are the simulations on the 'machine' of our choosing.

Newton and Soukup (2016) noticed that when players feel immersed and present in stories, they automatically want to act in the storyworld. Similarly, when the world or characters react in some way to the player, they 'acquire a sense of its presence' (Ryan 2015: 51). Therefore, we see that the terms immersion and presence, from a narrative perspective, are linked to a player's ability to act within the virtual world. I will now turn to the capability of the 'machine' from a technology standpoint, as it dictates what actions players may take.

Interactivity and agency: in technology

When used in relation to technology, 'interactivity' is used to consider how accurately the system can account for the actions of the audience. Technology is comprised of systems and so VR, as a medium, is naturally 'shaped by the structures of games' (Murray 2016: 162). It is inherently procedural (rule-based), due to the nature of programming languages. It is composed of interactions that are sanctioned or designed to be received by the system. VR receives input primarily (at this moment of writing) with a head mounted display (HMD) and hand controllers. At the basic level, the audience can interact by turning their head, which makes interaction closer to natural body movement. They may also have a hand controller, or two, which allows them to select, pick-up, view menus, and navigate. As I mentioned earlier, different platforms may have one controller or two, room-scale tracking, or simple head tracking. A large part of developing interactive media is to locate ways for audiences to interact that suits the technology and does not feel awkward. Therefore, it is crucial to have a vernacular to speak of the capabilities of the technology and the ways it can receive input – and important to note that this can be entirely independent of narrative.

In games, interactions are prototyped to gauge their appropriateness for the technology. The idea is to understand how to make actions feel seamless so the player can focus on the game. An example of this where narrative is not of initial importance is *The Job*

Simulator. When making *Job Simulator* (2016), a satirical VR game, developers Owlchemy Labs went through a very quick prototyping phase. They had been approached by Valve and HTC to develop a 3-minute game to showcase the HTC Vive, a VR headset with two controllers, when it was first demonstrated at the Global Game Developers Conference. As they prototyped and experimented with the Vive, they found interaction was unique because players could use their hands: 'they were the simplest input and when you added physics, things became interesting' (Reimer & Schwartz 2017-a). So, the team brainstormed hand interactions, such as juggling as a circus performer and making food as a chef. Many actions revolved around jobs, which lead the developers to jokingly call the prototype 'Job Simulator'. This is an example of where interaction with technology drove the idea for the creative project. It is especially relevant as the Vive was new technology at the time and Owlchemy Labs successfully made an engaging game from basic hand and head interactions.

The term 'agency' is related to technology because it is an aesthetic pleasure that can be derived from interacting with these systems. Digital media theorist, Janet Murray, explains agency as a sense of delight that comes from the 'satisfactory power to take meaningful action and see the results of our decisions and choices' (Murray 2016: 159) in artefacts like games. Chess and exploring the web are other examples where we may have a high degree of agency: players are autonomous, can select from a range of possible choices, and determine the course of the game (Murray 2016: 161-2) or experience. Agency and interactivity, in the area of technology, have their own meaning, and do not require narrative. It is difficult to draw concise differentiations when 'interactivity' and 'agency' can solely relate to technology and also, to narrative as 'interactivity' has a long history in the field of literature and 'agency' more recently, in digital literature.

Interactivity and agency: in narrative

To consider interactivity and agency in narrative, Ryan (2015) uses another metaphor prevalent in philosophy where the text is conceived of as a 'game'. Prominent theorists such as Derrida, Barthes, and Foucault have used 'play' and 'games' to consider readers as mediators rather than passively immersed in textual worlds. When the text is theorised as a game there is 'no longer a stable image of the world in which reader projects a virtual alter ego…' (Ryan 2015: 5). Play arises because there are 'no rules that fix meaning by anchoring language in an extralinguistic reality' (Ryan 2015: 129) or fictional world. Where readers of textual worlds are accepting illusion, exploring, and suspending disbelief, players of textual games are lucid, reflexive, and refusing illusion (Ryan 2015: 131). Interactivity resonates with these postmodern ideas because the reader experiences a 'liberation from the tyranny of the author' (Murray 2016: 166) leaving them forever free to interpret the text that is open and endless.

When I addressed immersion, I spoke of audiences actively importing schema and imagining. Audience participation in the 'text as game' metaphor is different to this kind of activity as it accounts for texts that purposely break immersion by refusing to present a cohesive world. Participants are always dipping in and out of the texts, much

like in Brechtian theatre, which reminds audiences they are watching theatre. Participants are told the text is not real by techniques such as self-referential characters who break the fourth wall. The 'text as game' metaphor is helpful to consider audience activity and their effect on the text. However, Murray (2016) and Ryan (2015) both conclude it struggles to account for immersion in narrative and our 'desire for narrational agency' where players can 'unfold a story that flows from our own meaningful choices' (Murray 2016: 167). Whereas the 'text as world' metaphor has some inability to account for agency and interactivity as their worlds and narratives are closed. Both authors conclude that discussing storytelling with technology lies in a combination of these metaphors, where we can conceive of audiences as participants who desire agency and understand how the various ways they may be immersed and present in narrative worlds.

By considering immersion and interactivity from a technology perspective, I have shown there is sensorial engagement and ways to track and interpret human actions in virtual space. From a narrative perspective, imagining is importing cognitive schema and participation leads to a desire for agency. I have shown the intersection between 'text as world' and 'text as game', immersion and interaction, is the body. To involve players' minds, we may involve their body and the reverse is also true. When this bodily participation is in a narrative virtual world, their pleasure of agency is tied to the story, not just the technology. Murray (2016) calls this 'dramatic agency', which she defines as:

> When action is motivated by something in the story, by an anticipation of some story event or action or revelation, and when the response rewards that anticipation in some appropriate way (Murray 2015: 189).

Dramatic agency requires two scripts: the authoring of the narrative (for motivation) and the programming (for the response). As we have seen, technology as a medium is inherently procedural, which means when we craft stories for VR and games, we are authoring procedures that determine characters, the world, events, and a range of narrative possibilities, and how they will happen or react to the participant's actions (Murray 2016:187). In participatory narratives, the goal is for these two scripts to match. When they do, the interactor feels the satisfaction of dramatic agency.

The goal for the participatory narrative is to be 'goal driven enough to guide navigation but open-ended enough to allow free exploration' (Murray 2016: 168) inside of a dramatic structure. It is important to note that participants are not authoring the digital narrative by interacting, they are interacting within the confines of the rules that storytellers have authored for their involvement (Murray 2016: 187-8). Murray indicates the role of the storyteller, then, is that of procedural author. She relates this concept to the role of a game master in tabletop role-playing games who is responsible for creating a compelling world, interesting characters, and a collection of challenges and events. Players 'have a great deal of constructive freedom in improvising the story' (Murray 2016: 186) but they must have incentive to do so. This is the same for digital games and, I argue, more so for VR, due to its participatory and performative nature, especially as actions are closer to natural body movement.

Developers can use narrative techniques to determine the varying degrees in which participants can act and have agency by framing their actions in a way that sets their expectations. VR experiences like *The Turning Forest* (VRTOV 2016) use a narrator to position the player as an observer with interactions that do not alter the course of the narrative. In this example, the player is positioned as Nathan of the past, being spoken to by the narrator, an older Nathan of the present. We cannot alter the course of events of the story in this premise, when someone is telling us their story. When I was met by the fantastical creature in *The Turning Forest*, the narrator said,

> ...Its crooked mouth opened to show long thin, spiky teeth, and music came out, music like I'd never heard before. As if its teeth had transformed into a beautiful string instrument (VRTOV 2016).

Here, the creature opens its mouth and I can interact by tapping or pressing on its teeth, which 'play' like a stringed instrument in response. While I am not changing events of the story, I do not find the need or desire to because I have not been positioned to expect this kind of agency. Instead, I experience a subtler form of agency, where my actions determine the kind of tune that comes from the creature's mouth. The result is each tune will be different for each participant.

If participants are performers, then they must feel inclined and free to perform. This is especially important in VR because performances cannot be forced. Narrative designer Rob Morgan (2016) notes a key way to do this is to implicate the player in the narrative. Dialogue and narrative tension can be used to as a call to action by directly accessing a player's imagination. When he was writing for Book of Spells (2012), a Harry Potter AR game, a technique Morgan used to engage the participant was to have a character ask the player a question: 'are you a wizard or not?' (Morgan 2016). In a slightly different form, it is the trick of 'accusation rather than explanation' in fiction, where the writer can have characters accuse each other of things in a scene in order to 'get-away' with delivering narrative information. If we begin our experience with an interview where the player is being accused of murder, we give them narrative information and allude to, and create mystery around, their identity in the storyworld. When they are intrigued, they are encouraged to perform or play along. These techniques are effective as they directly involve the body and speak to the identity of the player. Morgan (2016) notes that these techniques forces participants to stabilise their identity around a few important things that are critical to the dramatic unfolding of events.

These terms, agency and interactivity, can also describe the play experience. The play experience is what Murray (2016) refers to as 'symbolic action' or the 'dramatic context' where, regardless of the content (narrative or not), we will always have a 'plot' or an account of our involvement. This is evident when players describe their engagement and the way they felt when engaging from the smooth controls to the story or how they solved a problem in the game. Other examples of these 'plots' include: 'I encounter a confusing world and figure it out' (Murray 2016: 176) or 'I tried and tried again until I finally succeeded' (Murray 2016: 177). The intended play experience can also be described by developers using terms like these: 'we want players to have agency and choose how to complete this task and feel free to form strategies' or 'we want

interactions with the controls be simple'. In this context 'interactivity' and 'agency' are being used to discuss the play experience, not the narrative. These descriptions or symbolic actions do not refer to the narrative or construction of a narrative world specifically. They are what the technology, narrative, and narrative world can facilitate.

Conclusion

To clarify the terminology around VR storytelling, I have investigated immersion, presence, interactivity and agency as terms used to refer to technology and narrative. I have argued that it is helpful to be specific about which area these terms relate to when discussing crafting stories for technology, especially as the two combine in digital storytelling. I have shown that being immersed, present, interactive, and experiencing a sense of agency in technology and narrative find their intersection at the body. A combination of the 'text as world' and the 'text as game' metaphors allows us to consider readers as participants who desire agency. This combination also helps to understand the various ways players may be immersed and present in narrative worlds.

I have explored some narrative techniques as they relate to crafting stories for VR and games and shown how they each relate to the body. When storytelling with technology, storytellers can be strategic about the kinds of immersion, types of interactions and levels of agency they create in their stories. They can do this by considering how to position players physically and socially in the world, set their expectations, frame their actions, and implicate them in the story. These techniques are not new, but they are deployed in ways that function with a medium that is based on rules. Lastly, I have shown Murray's prediction – that the practice of the writer will be more that of the procedural author, who writes in a way that allows for player performance – is extremely relevant for the future of crafting stories with technology and worthy of further investigation.

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