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Immersive Stories: From Technological Determinism Towards Narrative Determinism

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Abstract

Following the wave of immersive production that occurred between 2015 and 2018, and in the face of new virtual, augmented, and mixed-reality devices, this article discusses the need to move from a technology- or device-focused perspective in the analysis and use of immersive technology towards a story-focused or story-first perspective. It starts with a technological perspective, contextualising the evolution of immersive technologies and their interpretation from a technological determinism point of view. Secondly, the ecological perspective provides an integrative reading of the technique, its use, and its experience, based on the concept of the environment. Finally, and after acknowledging previous research on the effects of immersive media on the audience, the article considers the narrative elements that are reinforced by immersive technologies in journalism and nonfiction, based on the qualitative analysis of projects. The article highlights narrative resources associated with the social character of the story, the spatio-temporal framework, and the emotional impact. It suggests a shift towards "narrative determinism," which would allow us to analyse and employ immersive resources in terms of their contribution to storytelling and to overcome the limitations of perspectives that are highly dependent on specific platforms or technologies.

Keywords

immersive storytelling; immersive technology; journalism; narrative; virtual reality

1. Introduction

In the early days of immersive digital media, an ecological view described the immersive medium as a sensory environment, as the medium that could probably most effectively extend human senses.

Hybridisation and experimentation both demand adaptation, keeping in mind that the human being is a narrative being. Therefore, in the construction of meaning and memory, immersive technologies emphasise the most powerful narrative elements to represent human complexity, although audiences have historically experienced immersion in other forms of expression such as literature, theatre, radio, television, or cinema.

This article discusses the need to move from a technology- or device-focused perspective in the analysis and use of immersive technology (virtual reality [VR], augmented reality, mixed reality) towards a story-focused or story-first perspective. Technology is still interesting and relevant, but there is a risk of falling into circumstantial assessments, circumscribed to very specific moments and defined by the existence of a particular technology or device.

Previous literature has studied the effects of comparing formats and devices (e.g., Kelling et al., 2019; Shin & Biocca, 2018; Van Damme et al., 2019), studying user immersion (de Bruin et al., 2022) or empathy (Sánchez Laws, 2020), and considering a psychological perspective (Bowman et al., 2021). This article aims to discuss the narrative elements reinforced by immersive technologies in journalism and nonfiction, based on a historical and conceptual review and on a qualitative analysis of immersive projects. The article highlights aspects such as the social character of the story, the spatio-temporal framework, the emotional impact, and its study. It identifies challenges and limitations that hinder the arrival of a narrative determinism in this field that would facilitate its consolidation and projection, in the face of the pressures and barriers imposed by technical novelties.

2. A Technological Perspective

In the first instance, the technical dimension will be reviewed, which is mainly reflected in the devices used to access immersive experiences. Starting with the concept of immersion, the steps that immersive technology has taken are examined through the perspective of technological determinism.

Immersion is a polysemous term of Latin origin (*immersio*) that means, strictly speaking, to entirely submerge a solid body in a liquid. In this context, we understand immersion as the ability to situate, surround, and involve the user in the reality represented. This has also been interpreted by different authors who speak of telepresence (Steuer, 1992), being there (Heeter, 1992), or first-person experience (de la Peña et al., 2010), meanings that appeared in initial research on technologies that facilitated the immersive condition in the 1990s. Consequently, immersive technologies are those that produce this stage of immersion, making the users feel that they are in a place, a time, a specific reality. To this end, these technologies transmit information that replaces the sensory perception of the physical world—for example, images through headsets, sound through headphones, vibrations through gloves or remotes, and other sensory effects.

Immersive technologies are classified according to the degree of integration of the information they introduce (virtual world) and the stimuli of the reality that surrounds us (physical world), and three levels are established. First, when the virtual level replaces the physical level for the most part we speak of VR. In the words of Steuer (1992), this is an environment in which the receiver experiences telepresence. Secondly, when there is an overlay of the virtual plane on the physical plane, through glasses or screens, we refer to augmented reality. That is, a type of VR in which the response to stimuli is superimposed on real-world objects (Sherman & Craig, 2003). Thirdly, when there is a combined integration of virtual and physical planes, with interaction

between the two—for example, with physical objects or spaces intervening in the virtual world—we speak of mixed reality: "the incorporation of virtual computer graphics objects into a real three-dimensional scene, or alternatively the inclusion of real world elements into a virtual environment" (Pan et al., 2006, p. 20).

However, apart from these three categories, technology acts in other, perhaps less sophisticated, dimensions where it also generates immersion. The search for this resource has been pursued in audiovisuals with sound environments or on the web with continuity effects such as parallax, or interactivity and personalisation of the story (Sirkkunen et al., 2021; Vázquez-Herrero & van der Nat, 2023; Wang & Sundar, 2018).

Ideas of immersion and VR have always been closely linked to devices and systems: "Since immersion depends on vividness, its factors are closely related to the devices that lead to realism in representation" (Ryan, 1999, p. 112). A specific case such as VR has often been defined in relation to a particular technological system (Steuer, 1992).

Immersion began to develop with stereoscopic vision and panoramic projection technologies, including Wheatstone's stereoscope (1838), Brewster's portable stereoscope (1849), Louis Ducos du Hauron's anaglyphs (1891), Raoul Grimoin-Sanson's Cinéorama (1897), the panoramic and immersive cinema of the mid-twentieth century, and Hugo Gernsback's teleyeglasses (1963). Progress continued to be made towards head tracking with lateral (panoramic) and absolute (3-axis) positioning. The key contribution here was Ivan Sutherland's Sword of Damocles (1968), the first viewing helmet with orientation detection of the wearer's point of view. Surround sound reached its highest level with binaural sound, which allows us to locate sound in space.

On the more physical level, immersion attained the introduction of the body into the scene (and mapping the exhibition space), as well as incorporating touch and interaction. In terms of devices that exploited senses other than the visual and auditory, Morton Heilig's Sensorama (1956) was one of the most striking, as well as Sandin, Sayre, and DeFanti's data gloves (1977), exoskeletons, and peripherals by VPL and Jaron Lanier (1988). Simulators were also developed, such as Link Trainer by Edward Link (1929), and NASA's Virtual Environment Workstation in the mid-1980s. Finally, the design of CAVE and fulldome systems gave rise to immersive and multi-user spaces.

From the 1990s onwards, the development of immersion turned to the World Wide Web with the integration of 3D models and later the HTML5 standard and libraries such as WebGL. In 2012, Palmer Luckey launched a crowdfunding campaign for the first Oculus prototype of a VR headset for immersive 3D gaming. In 2015, this product line began to explode causing, consequently, an increase in available content. The performance of 360-degree cameras and headsets also improved, with controls, gesture detection, and interaction with the physical space; and mixed-reality devices appeared (Microsoft Hololens, Magic Leap, among others). In February 2024, Apple's Vision Pro was launched, which, as on previous occasions, attempted to define a product category: a "spatial computing" mixed-reality device that, as its promotional video demonstrates, intends to change everyday tasks and generates new interactions between physical and virtual space.

This summarises the evolution of technologies that, for the most part, and in keeping with the way technology evolves, did not consider storytelling as a main objective, but rather military, industrial sector,

and educational simulation. In the 1990s, initiatives emerged in American universities to experiment with immersive technologies applied to journalism and documentaries—for example, the 360-degree documentaries (Pavlik, 2001), the I4 project (McLeod, 2003), and the works of the Immersive Journalism team led by Nonny de la Peña, such as *Gone Gitmo* and *Hunger in L.A.* in 2007 and 2012 respectively. It was then that immersive journalism was defined (de la Peña et al., 2010), in a conception closely linked to the device—such as CAVE or head-mounted display. Later, the term immersive journalism would be used for a wider variety of resources of immersive rhetoric (Domínguez-Martín, 2015) and would be the protagonist of a brief but fruitful stage of experimentation between 2015 and 2018: "As technological developments have propelled journalistic VR out of university labs and research institutes, experimentation has blossomed" (Mabrook & Singer, 2019, p. 2096). Subsequently, this immersive hype, which generally translated into 360-degree videos (Sirkkunen et al., 2021), faded (López Hidalgo et al., 2022). When the hype died down, production returned to an experimental and creative level, albeit limited in volume by low penetration of consumer devices—Alsop (2023) estimates 34 million VR headsets have been sold worldwide, based on 14 million in 2020.

We are currently at an early stage where the technology is advancing much faster than its adoption in society. In barely a decade, we have seen the commercialisation of numerous VR headsets towards a certain democratisation of access to such devices. While VR is still a niche category, without widespread popularity, the technology continues to advance and differentiate itself in terms of technical issues if not in the way it is used.

At this point, we can interpret the development we have seen so far in immersive technologies from the perspective of technological determinism. This concept assumes that technology is the basis of human activity and that it has the capacity to influence society, although it has been approached with varying degrees between the causal technology–society link proposed by sociologist Thorstein Veblen and softer positions. In the field of communication and following McLuhan (1962), technological determinism shapes our social activity, and, for this reason, we communicate in whatever the medium of the moment is. It is evident that "media and technologies 'mediate' the world for us in each of our interactions" (Islas & Arribas, 2023, p. 265). Indeed, authors such as Smith and Marx (1996) consider that this sense that technology has power as an agent of change is part of the shared body of knowledge, especially from one's own experience with technology, when the user realises that they are subjecting any activity to transformation. This is no minor issue now that we are seeing the effects of automation and artificial intelligence in our lives and the latest launches of spatial computing headsets.

Theoretical discussions of technological determinism have argued for a technology that develops autonomously, capable of an out-of-control history-shaping process (Winner, 1977) and of determining social change (Kline, 2001), confronting social constructivism. Deterministic discourse elides human intention and defines new media technologies as revolutionary and transformative (Drew, 2016). Conversely, technological determinism has been criticised (Williams, 1977), especially when referring to social processes such as communication. With optimistic and critical views, technological determinism considers that technological innovation is a determinant for society (Saperas, 2018).

The journey completed by immersive technology can be interpreted from a determinist perspective because it has generated changes and needs in society, with disruptive proposals for experimentation, entertainment, and communication. Immersive technologies have been shaped as another medium and, in this sense, they

manage to influence society. On the other hand, until now more attention has been paid—by academia and beyond—to technique than to cultural uses and audience participation, which are fundamental elements in the field of narrative.

In the following section, I consider media ecology, a scientific discipline that includes technological determinism but articulates a broader and more integrative view through the concept of environments.

3. An Ecological Perspective

Media ecology is a generalist theory (Scolari, 2010) and a complex and systemic meta-discipline (Islas, 2015) that studies media as environments. While it is applicable to any form of communication, I consider the immersive field to be particularly relevant to analyse from this perspective—explored previously by Horrocks (2004) and Rubio-Tamayo et al. (2017)—because it is itself based on placing the user in an environment (a place, a space, a scene). Earlier we observed the evolution of immersive techniques through technological determinism—this is a concept that has also been situated within media ecology, in the work of figures such as Marshall McLuhan. However, the ecological vision goes further and puts forward another perspective in which the media—in this case immersive is considered another medium—are species in an ecosystem in which they relate in multiple ways to other species, since "no medium exists alone or has meaning alone, but in permanent relation to other media" (McLuhan, 1964).

So-called precursors of media ecology—such as Eric Havelock, Lewis Mumford, Jacques Ellul, and Harold Innis—have presented an ecological perspective based on the analysis of communicative processes and mediating technologies, in some cases based on technological determinism. The most prominent name of the Toronto school, Marshall McLuhan, insisted on the conception of the media as environments, alluding to the immersion of the user, and the uses and effects caused by each medium. It is precisely this vision that is most appropriate for interpreting what today's immersive technologies are: an environment in which the user is immersed and whose aim is to be as unnoticeable as possible, to achieve a symbiosis that eludes the physical world around us and leads us to an experience. The immersive medium is likely the medium that most effectively extends the senses of the human being, in a similar way that mobile devices have been considered authentic extensions of the body (Renó, 2015).

However, the ecological vision must also consider that the immersive medium appears in a media ecosystem where other consolidated media—such as the press, radio, television, and digital media—already exist. Marshall McLuhan and his son Eric worked on systematising the analysis of media ecology and proposed the tetrad of media effects (McLuhan & McLuhan, 1988), the closest approach to a scientific analysis model (Scolari, 2015). This tool poses four questions to understand the evolution of media: What does the medium enhance? What does it make obsolete? What does it retrieve? What does it reverse when pushed to extremes?

Applying the tetrad to the immersive medium, it is observed that it extends several senses, mainly visual, auditory, and tactile, but also reinforces the interactive faculty to bring us closer to an immersive experience. As a non-consolidated medium, it has not led to the substitution of other media, but it limits the use of some devices and competes for the space of some mobile devices, consoles, television, and computers. What the immersive medium recovers is ritual, the multisensorial representation of a reality with a physical and participatory component (agency); it tries to assign a central role (embodiment) in a digital performance.

Taken to the extreme, it reverses the exploration of collective forms of consumption, a new turn from the individual to the social—albeit very limited for the moment—and from the individual single-device experience that has progressively established itself towards custom-created exhibition spaces (installations and museums) that are sometimes shared.

Following Logan (2010), a media ecosystem is made up of different elements: humans, media, interaction and communication technologies, and languages. Of these, language is fundamental in an immersive medium to represent reality and take advantage of immersive conditions; but it is also disruptive compared to consolidated media and is still in its infancy (Domínguez, 2017). With regard to the other three elements, and returning to McLuhan (1962), every technology tends to create a new human environment; what the immersive medium creates is experience, a process rather than an outcome: "a fluid and reflective concept, rather than a fixed and isolated factor" (Shin & Biocca, 2018, p. 2815). Immersive technologies provoke effects on the reception of messages, which result in the experience, so that users become a participatory, engaged, and proactive audience.

Those effects were partially tested in previous literature. Studies on immersive journalism and nonfiction demonstrate effects on the role of the user, who has the opportunity to become a reporter and decide how to look or focus their attention (Jones, 2017), and on their sense of presence (Cummings et al., 2022; de Bruin et al., 2022; Van Damme et al., 2019; Vázquez-Herrero & Sirkkunen, 2022). The immersive experience also affects enjoyment (Van Damme et al., 2019) and is affected by the device, the users' traits, and contexts (Shin & Biocca, 2018). But the consequences of consumption in the environment generated by immersive technologies go further and relate to higher empathy (Sánchez Laws, 2020; Shin & Biocca, 2018; Vázquez-Herrero & Sirkkunen, 2022), deeper knowledge (de Bruin et al., 2022), and the reinforcing of news credibility (Kang et al., 2019). Convenience has been assessed—with gratifications identified for their use (Mabrook & Singer, 2019)—while ethical risks and critiques of the use of immersive technologies in fields such as journalism have also been identified (Palmer, 2020; Rose, 2018; Sánchez Laws, 2020), although several studies have focused their analyses on a comparison between technologies, devices, and formats.

Following McLuhan (1964), the idea that "the medium is the message" is evident in immersive media because the experience resulting from the use of immersive technologies has the potential to reinforce a message and generate associated emotions that promote agency. However, while I believe that the immersive medium is—as a technology—important, I believe that the content should not be undervalued. Following Miroshnichenko (2016), contemporary media—including immersive media—are not just information carriers but can create reality. In the face of accelerated technological innovation, we should look for values that resist constant change and focus on creative and narrative aspects, as discussed in the next section.

4. A Narrative Perspective: Narrative Elements at the Core of Immersive Stories

This third approach aims to go beyond the first wave of research focused mainly on early generally limited immersive works and today's somewhat more evolved and diverse works. It proposes a story-first approach to the analysis and production of immersive stories in journalism and nonfiction, in order to prioritise narrative over technology and to continue advancing in knowledge and creation independently of a specific technology. It is, therefore, a proposal with an eye on the contribution that is made to the narrative, being more platform- or technology-agnostic.

The "storytelling-narrative dimension" is one of the factors associated with VR—as an immersive technology—through the narrative of the virtual environment and the story that users create through interaction (Rubio-Tamayo et al., 2017), for example, through immersive features in the narrative such as the user being active or passive in the story (de Bruin et al., 2022). Previous studies on the relationship between immersive media and narrative conclude that there is a challenge to narrative conventions (Domínguez, 2017) and a redefinition of classic narrative elements.

Paíno Ambrosio and Rodríguez Fidalgo (2021) proposed an immersive communication model—individual and multi-user—that considers the changes caused by the incorporation of immersive technology in communicative processes, including the multimedia construction of the message as well as the user's decision-making—and deepening—capability. Another contribution to immersive narrative comes through the virtuality–reality continuum, where Rubio Tamayo and Gértrudix Barrio (2016) integrate the concepts of embedded and emergent narrative, differentiating between that which is pre-established and that which emerges from user interaction. However, immersive formats coexist with other traditional formats (video or text) and between them, there is no disruption, rather they form part of the same continuum of emotionality and rationality (Vázquez-Herrero & Sirkkunen, 2022).

The contribution of immersive media to narrative is associated with different aspects, among which space is a key point, as a simulation of a reality, using places as narrative strategies and through dialogue with space (Kukkakorpi & Pantti, 2021); but also because of the relevance of surrounding action when generating content (Vázquez-Herrero & López-García, 2017). The sensation of presence is a condition closely linked to space and one of the main features attributed to immersive media (de Bruin et al., 2022; de la Peña et al., 2010). On the other hand, the emotional dimension is connected to the narrative form (Greber et al., 2023a) and is reflected in empathy and embodiment (Shin & Biocca, 2018), audience involvement and engagement (Vázquez-Herrero & Sirkkunen, 2022), and by placing the user at "a paradoxical threshold between proximity and distance" (Ceuterick & Ingraham, 2021, p. 9). This enhancement of the sense of presence and emotional arousal implies more constraints for processing the information in the story (Barreda-Ángeles et al., 2021; Vázquez-Herrero & Sirkkunen, 2022). However, emotionality raises criticisms of the concept of VR as an "empathy machine" in fields such as journalism (Jones, 2021)—where impartiality and ethics also play a role—or prosocial storytelling—whose effect does not come directly from the use of immersive technology but through an engaging narrative (Pressgrove & Bowman, 2020). Therefore, the study of aspects related to narrative development in the immersive medium is crucial for overcoming the more technological view. Recent projects of diverse natures—beyond 360-degree video and basic VR—are presented below, with a focus on how the story is told through immersive media and how those resources contribute to representing reality.

The spatio-temporal framework takes centre stage when the immersive medium transports us to a distant, unknown, inaccessible, or particularly significant place or moment. This is the main value of many 360-degree videos that transport us to places where catastrophes have occurred, such as in *Fukushima, Contaminated Lives* (2016), war conflicts in *The Fight for Falluja* (2016), or remote places in *Ecospheres* (2020). *Home After War* (2019) shows a home in Fallujah (Iraq) after the city was under the control of Islamic State, through a room-scale interactive experience where the space was captured with photogrammetry. The user explores the house by moving through it and sees for themselves the state of destruction of the place. Another possibility is to represent a historical event and take the user back to the exact moment (*JFK Memento*, 2023). In these projects,

the space is a central element of the story and the possibility of placing the user in the scene reinforces the storytelling, as these are exceptional situations or places that provide an account of a reality.

With a much more physical dimension, *Carne y Arena* (2017) is a project defined by its director Alejandro G. Iñárritu as "semi-fictionalised ethnography" and based on an installation with several spaces to address the human condition of migrants and refugees. The experience represents the journey of a group of migrants crossing the US–Mexico border. It has five spaces where each visitor individually puts themselves in the place of the migrant: the access room, the freezer, the desert, the cell, and the exhibition. There are several spatial elements that have a narrative value in the experience; for example, the freezer is a refrigerated container where the "migrant" takes off their shoes and learns the story of the shoes that are left abandoned around the border fence; the temperature is low, there is constant ventilation, and all the elements are cold. On the other hand, the crossing through the desert occurs in a room with a sandy floor and a strip of dim orange light that simulates the sunrise; it is at this point that the user visualises the central scene with a VR headset, with freedom of movement around the room, sound effects, a higher temperature, and wind. This is one of the most complete immersive experiences to date and the narrative use of space is one of the key elements.

The social character of the story is an important factor in immersive journalistic and nonfiction stories that show ways of life and social debates about racism (*MLK: Now Is the Time*, *Travelling While Black*), living conditions (*We Live Here*, *Dreaming of Lebanon*, *Clouds Over Sidra*), migration and displaced people (*The Key*, *Carne y Arena*), and health and inclusion (*Goliath: Playing With Reality*, *Notes on Blindness*). A narrative resource employed brilliantly in some projects is the construction of the character in such a way that the user can get to know multiple edges of a person's complexity to better understand their reality. *We Live Here* (2020) tells the story of Rockey, a homeless person living in a tent in a park, from which she is evicted without her personal belongings. The user can move around inside the tent and, by interacting with the objects, learn about the protagonist's life, fragments of her past, and some of her dreams in order to understand the present and the difficult situation she is facing.

Immersive experiences seek a direct relationship with the user through first-person testimonials that look the user in the face. In *Home After War*, Ahmaied tells the story of his family's return home after the end of the fighting; his voice is activated when the user approaches and looks towards him in the different rooms. *Dreaming of Lebanon* (2023) is defined as an "interactive VR documentary" in which Rafik, Josephine, and Batoul tell the story of the challenges of living in a country in crisis. The user dialogues with each protagonist by choosing the questions, sitting face-to-face with them. In this way, the testimonies converse directly with the audience and bring them into the scene, similar to breaking the fourth wall in cinema.

In order for the user to put themselves in someone else's shoes—a matter directly related to the much-discussed empathy—a narrative must accompany the technology. We see this in the aforementioned *Carne y Arena*, where the audience literally puts themselves in the shoes of one of the migrants who crosses and is captured, with the police pointing directly at them, feeling their heartbeat. *Notes on Blindness: Into Darkness* (2016) narrates John Hull's experience of blindness from the tapes he recorded during the process. It uses binaural sound and visualisations—reduced but harmonised—in such a way that the sound gradually uncovers elements of the scene, sometimes ephemerally, until it reconstructs what is happening. Thus, the user puts themselves in the role of a blind person and begins to pay more attention to the sound plane, in

the same way as the protagonist. *MLK: Now Is the Time* (2023) recreates Martin Luther King's well-known "I have a dream" speech and contextualises it with a description of the inequalities that underpin the struggle for freedom and equality. The user has several opportunities for interaction that allow them to experience situations of inequality based on race, but the most powerful narrative and symbolic opportunity is in raising their fist in the air to move through the experience.

Narrative resources also extend to the way a narrative is constructed, employing story-like structures, threaded by a metaphor that takes the user on a symbolic journey that engages and progressively uncovers reality. *Goliath: Playing With Reality* (2021) explores the limits of reality and tells a story about schizophrenia and the power of online gaming communities. It employs visual effects and symbolic interactions such as a game in an arcade machine, a shooting game, and various elements that allow the user to hear a voiceover or feel a worm on their hand. Users are asked to record their name at the beginning—sometime later it is used as a resource to effectively simulate voices they hear. *The Key* (2019) is a room-scale experience that takes users on a metaphorical journey in which they interact with various elements to progress through the story. Users progress from dreamlike environments and obstacles to reality—from danger to a safe place—and finally discover that they have been told about the life of a refugee and the key they always keep from home, even though they can never return. The power of metaphor and the final twist are narrative devices far from the usual practices of journalism and nonfiction, but it makes masterful use of such resources to convey the complex reality it addresses.

Finally, it is worth noting that concluding twists have also been used in other projects. *Home After War* incorporates an explosion effect that surprises the user who was calmly navigating the home in Fallujah. *We Live Here* employs animation and overlapping sound layers to mark the transition from the interior of the tent, where the user was learning Rockey's story, back to the reality of the eviction. We could refer to an "awakening" that causes a disruptive transition between the experience in which the user is immersed and a revealing ending, which places or returns them to the real context of the story.

The aforementioned resources, although often used in immersive media, have been implemented in other narrative media. Thus, the introduction of perspective in painting (Ryan, 1999), the construction of characters, rich descriptions, or the use of testimonies in narrative (Allan, 2019), and the fourth-wall break in television and cinema (Auter & Davis, 1991), as well as metaphors, symbolism, and narrative twists have all been widely employed to captivate the audience. What we see here is a new approach to immersion using familiar techniques, as the quest for audience immersion is a long-standing desire of any form of expression.

5. Conclusion

The study and use of immersive technologies has been closely linked from its beginnings to a technological determinism through which the evolution of techniques and devices generates change in society; however, the mere appearance of a technology does not mean that the public will adopt it (Pacheco, 2023). After revisiting this vision and the ecological perspective, in which the immersive medium generates a new environment and functions as an extension, a shift towards a story-first approach is suggested. This sort of "narrative determinism" would make it possible to analyse and use immersive resources considering their contribution to the telling of a story. This suggests overcoming the limitations of perspectives that are highly dependent on specific platforms or technologies, especially considering that these are increasingly diverse: "There will be

no single medium that absorbs all others; instead, different media will continue to flourish, each augmenting different aspects of our daily lived experience" (Bolter & Engberg, 2017, p. 154).

At present, the volume of immersive nonfiction production is limited, following the hype of 360-degree video and VR that occurred between 2015 and 2018. Platformisation is also playing a notable role in this field, where the most popular devices are concentrated in a few brands such as Meta—which acquired Within, one of the most successful cinematic VR distribution applications, and closed it in February 2023 to bring access to content under the Meta Store. At the same time, technological changes demand constant updating; for example, the National Film Board of Canada announced that *The Enemy* would no longer be available online because technology is moving so fast, and they are promoting an archive to preserve digital creations that become obsolete.

Research to date has focused on technological and production aspects of immersive experiences, in a fast-changing context in which well-functioning low-tech projects coexist with a certain fascination for technical sophistication, despite not reaching a mass audience. The focus in recent years has shifted from technique to experience, effects, and ethical challenges. However, revaluing the narrative contribution of immersive media is a shared concern of other researchers, who call for the need to "continue building theoretical approaches regarding narratives and storytelling for these new media" (Rubio-Tamayo et al., 2017, p. 15) and suggest "future productions—in addition to creating a plausible IJ [immersive journalism] experience—focus on storytelling" (Greber et al., 2023b).

The article has highlighted narrative resources in relation to spatio-temporal framework, the social character of a story, and the emotional impact, in order to underline the shift towards narrative determinism. This approach should also contribute to ensuring that technology is at the service of the story, that its contribution reinforces the narrative and is not a mere technical asset, avoiding relying on sophisticated and flashy gimmicks where the story remains in the background. The purpose has not been to systematise the construction of immersive stories, but to contribute to this field of study with a consideration of three perspectives (technological, ecological, and narrative) and some notions about the impact of the immersive medium on narrative. Future lines of research should take steps towards a deeper but also integrative understanding of journalistic and nonfiction narratives through interactive and immersive media.

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The author declares no conflict of interests.

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