RODICA MOCAN

FUTURE REALITIES. CONCEPTUAL AND TECHNOLOGICAL PERSPECTIVES ON VIRTUAL REALITY NON-FICTION

Rodica Mocan
Babes-Bolyai University, Department of Cinematography and Media, Cluj, Romania
Email: rodica.mocan@ubbcluj.ro

Abstract: Virtual reality represents a significant paradigm shift in digital media content development, determining the emergence of new media genres. Virtual reality non-fiction (VRNF), also known as VR documentary, offers a fertile ground for research from an interdisciplinary perspective involving literature, philosophy, psychology, neuroscience, journalism, media and communication studies, cinematography, and many others. The paper addresses some conceptual perspectives that determine the grammar of the visual language in the production of VR documentaries, such as perception, immersion, or embodiment studies, and aims to determine if there are – or should be - preferable topics tackled with this technology.

Keywords: immersive journalism, virtual reality non-fiction, VR documentary, responsiveness, perception, immersion, embodiment, inclusion, interaction.

REALITĂȚI VIITOARE. PERSPECTIVE CONCEPTUALE ȘI TEHNOLOGICE PRIVIND REALITATE VIRTUALĂ NON-FICȚIONALĂ

Rezumat: Realitatea virtuală reprezintă o schimbare semnificativă de paradigmă în dezvoltarea conținutului media digital, determinând apariția de noi genuri media. Realitatea virtuală de non-ficțiune (VRNF), concept cunoscut și sub numele de

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documentar VR, oferă un teren fertil pentru cercetare dintr-o perspectivă interdisciplinară care implică literatură, filosofie, psihologie, neuroştiinţe, jurnalism, media şi studii de comunicare, cinematografie şi multe altele. Lucrarea abordează câteva perspective conceptuale care determină gramatica limbajului vizual în producţia documentarelor VR, cum ar fi percepţia, imersiunea sau studiile despre întruchipare şi corporalitate, propunându-şi să determine dacă există - sau ar trebui să fie - subiecte preferate abordate cu aceste tehnologii.

Cuvinte-cheie: jurnalism imersiv, non-ficţiune în realitate virtuală, documentar VR, receptivitate, percepţie, imersiune, întruchipare, incluziune, interacţiune.

1. Introduction

The development of digital technologies has had a significant impact on research, education, health, or the arts. While this impact is evident in the advanced technologies used in those fields or specific scientific achievements, it is even more prevalent in the consequences of their adoption on how we live, communicate, create content, or in the economic, political, and social models they generate.

The emergence of any new media technology raises the issue of its widespread adoption. Nevertheless, once the business model – which involves accessibility and affordability to a sufficiently large market, successful marketing, and a right distribution channel – is successfully implemented, there is pressure to create content tailored to that platform. The widespread and affordability of new technologies like head-mounted displays (HMD) and hand-controllers has increased exponentially the need for quality VR content.

Virtual reality (VR)[1] represents a significant paradigm shift in digital media content development, determining the emergence of new media genres. Virtual reality non-fiction (VRNF), also known as VR documentary, offers a fertile ground for research from an interdisciplinary perspective involving literature, philosophy, psychology, neuroscience, journalism, media and communication studies, cinematography, and many other fields.

We started the study using an Oculus Quest headset, looking for VR documentaries better to understand their place within the new media non-fiction category. Simultaneously, we searched for literature to identify the relevant theories that would frame the genre and would enable a better understanding of the technology and the techniques used in VR content production. The study has limitations due to a lack of previous experience with VR environments – such as the one a gamer would have – and because we were facing a motion sickness specific to the use of VR technology and HMD. Possibly, we

experienced motion sickness at a higher level than other users due to the unfamiliarity with the environment and the device.

These limits prompted us to look for answers focusing on the technology used – the new Oculus model has partially solved the problem by providing a higher refresh rate – and the cinematic techniques used. The paper addresses some conceptual perspectives that determine the grammar of the visual language in the production of VRFN. Perspectives vary from perception, immersion, and embodiment studies and aim to identify some of the specific elements of VR visual grammar. At the same time, we were trying to determine if there are – or should be - preferable topics tackled with VR technology and if this new form of immersive storytelling contributes to increased social involvement.

The production of media content for immersive environments – heavily stimulated by the interest for video games, with a predicted market-value by 2025 of over 300 billion US Dollars and over 2.5 billion users worldwide[2] – resulted in a wide range of media productions, sometimes difficult to categorize even for the producers.

The most accepted definitions of the terminology used when referring to immersive, interactive audio-video productions relate to the technology used, the combination between real and virtual environments, and the level of interaction/immersion of the viewer/user in/with the real/virtual environments. Virtual reality (VR), augmented reality (AR[3]), and mixed reality (MR[4]) are all part of extended reality (XR[5]); the latter definition opened enough to include future technological developments.

Some of the perspectives that characterize the technological aspects of non-fiction virtual reality productions are related to the virtual reality environment created by computer-generated images. Other perspectives relate to the image's three-dimensionality and the extension of the visual field to 360 degrees. Computer games and the extensive user experience gained over time by gaming industry inspired the possibility of enabling the viewer to navigate the space in a non-fiction story, very much like the main character in a fictional story.

Since the widespread of head-mounted devices, there is

significant growth in the interest for virtual reality content, which provides an increased immersive experience. Google DayDream, Facebook Oculus, HTC Vive, or Microsoft HoloLens are some of the most popular headsets used for accessing VR content. Unlike some of the smaller players in this industry, aside from the devices, these giant companies are also developing hosting solutions, VR distribution platforms, and VR business models – often converging with existing ones – extending competition from the headset market to social media and the wider Internet.

Bevan and Green[6] present an extensive mediography of Virtual Reality Non-Fiction in the form of history, covering the period between 2012 and 2018. The data set contains 603 examples of VR non-fiction classified by theme, directors, producers, film festivals, and timeline. Some of these productions use 360 degrees cameras, allowing the viewer to contemplate the panorama from a fixed point perspective. The story is adapted so that the viewer can choose the angle from which he wants to contemplate the space. Other productions recreate the space in computer-generated environments, and the viewer can navigate the space like characters in computer games. In such a case, the viewer's perspective tells the story, becoming a participating actor in the story. The viewer is isolated from the natural environment through the head-mounted device, and the image and sound immerse him in the story. Newer productions offer increased possibilities for interaction in the story through controllers that allow point-and-click, hypertext-like, space navigation.

The use of cinematic techniques adapted to new technologies allow the creation of experiences very close to reality, fueling the hope that virtual reality will become the preferred platform for non-fiction storytelling while also heralding the birth of "future reality."

2. Immersive journalism

"Immersive journalism[7]" was the term used to label some of the first VRNF productions. Produced by experienced journalists, they used storytelling techniques specific to the journalistic style.

Simultaneously, the technology had the role of making the viewer/user involved in the story, much similar to the known "immersion journalism[8]" style.

Nonny de la Penna[9] – American journalist, documentary filmmaker, and entrepreneur, who consecrated the term – started experimenting with virtual reality in 2007 when she produced the documentary "Gone Gitmo." The documentary tells the story of a Guantanamo Bay prisoner by placing the viewer in the center of the story recreated in Second Life's virtual environment. Despite the simple graphics and the rudimentary virtual environment, the viewer experiences the ordeal of being imprisoned by the avatar he emulates, in a story reconstituted based on letters sent by the real prisoner, narrated by his father.

Her experience as a journalist dictated the documentary's approach and consecrated the immersive journalism genre: a production that, through the use of digital technology, enables the first-person experience into a story, very much like in a video-game. There was no wearable technology involved; the feeling of immersion was determined more by storytelling techniques rather than realistic recreation of space or sensory stimuli.

Her interest in immersive experiences continued with Project Syria's acclaimed virtual-reality re-creation of a street corner in Aleppo. The viewer finds himself caught in the middle of a bomb attack and experiences life in an uncertain environment, surrounded by wounded people and frightened children separated from their parents. While still overwhelmed by the emotional ordeal of war and death, the viewer has the chance to visit a refugee camp where he can witness firsthand what the consequences of war are on the long turn. The World Economic Forum initially commissioned this project presented at the Davos Forum, "with the idea of compelling world leaders to act on this crucial issue."

Consistent with her vision, De la Penna produces immersive journalism pieces that inform, impress and convince about social action's importance. She is tackling various sensitive subjects such as hunger police violence, domestic violence, or law and justice.

Focusing on fact-checking, truth-telling, and emotional intuition

from her career as a journalist, de la Penna is harnessing the emotional power of immersive storytelling. She consecrated the concept of immersive journalism, even if, in time, it started to overlap with what others call VR documentary.

Immersive journalism, emergent genre not yet fully consecrated as such, has revolved around the need to raise awareness about social and political issues. Some of the projects – such as De la Pena's Project Syria, commissioned by the executive chairman of the World Economic Forum – have the specific objective of influencing policies, or changing attitudes. From this perspective, immersive journalism is blurring the border between social PR and journalism.

Kool[10] raises important ethical questions regarding the use – or even over-use – of immersive techniques that are "surrounding the viewer in the story," achieving a "novel effect of realness, which changes the relationship between viewer and content." He mentiones the various ways in which the use of new technologies has influenced the public's perception regarding war or other social issues, stressing how the use of VR and related technologies – goggles, and other haptic devices – is overwhelming the viewer and is influencing its reactions. "Just as black and white video in the Vietnam War drastically changed the treatment of the war, it is important to question what access to all of these new and simultaneous sensory capacities can do to the viewer and the story", adds Kool. He is concluding by encouraging skepticism and awareness regarding the belivability of these productions, due to the engrossed sense of presence provided by the technology and narrative structures used in immersive journalism.

Goutier[11] describes four forms of immersive journalism, depending on the level of *inclusiveness*, defined as the extent to which the experience excludes the exterior world and *interaction* or the extent to which the viewer can interact with the virtual environment. In specific productions, one can only ***observe the location*** from various angles. A 360-degree camera films the story, and one can view the scene from all angles as an observer.

In other productions, the main goal is *to* ***explore the story*****.** One can observe the location and navigate the environment while gaining more information about the place or the events. In both cases, the

inclusiveness level is low since no special equipment is involved, other than a computer or a mobile device. However, the possibility of interaction with the environment gives the user agency in the story.

With different devices (head-mounted display or haptic), one can reach more profound inclusiveness and can become able to ***observe a story*** without really being able to interact with it. In this case, there is high inclusion in the story but limited interaction.

In the case of more sophisticated productions – such as where HMD (VR goggles) is necessary – the viewer can have a first-person experience interacting with the environment and ***participating in the story.*** Both inclusiveness and interaction are high, and the result is an experiential dimension of the viewing experience.

Goutier's study states that 58% of productions invite the viewer to *observe a location*, about 28% to *observe a story*, while only about 7% invite the viewer *to participate in a story* or *explore the story.* The matrix included in the study provides an overall view of the complexity of technologies, techniques, and expertise needed to reach a high level of interaction or inclusion while also being an excellent instrument in analyzing VR media content.

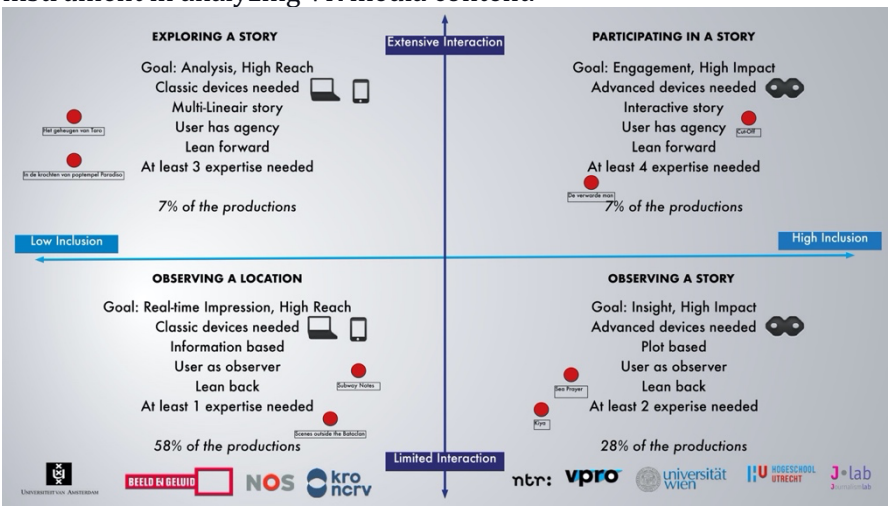

Figure 1. *Goutier matrix on the four forms of immersive journalism, based on the level of inclusion and interaction. [source: prt. scr. Goutier 2019, p. 4)*

Inclusivity and immersion, in and with the story, are the two variables that enable one to assess an immersive journalism media production. Figure 1 illustrates how an immersive journalism piece can be classified based on where it stands in one of the matrix quadrants. The same matrix can help understand and analyze any other VRNF production because the two variables are not exclusive to journalistic productions but any different non-fiction story.

3. Space and emotional engagement

Immersive journalism is also known as VR journalism. The most prevalent technologies used in telling the immersive VR story are virtual reality environments and spaces, created by combining video-games and linear and non-linear documentary-style descriptions.

Space is an essential element in telling a story in VR, with the narrator at its center, referencing, navigating, and exploring or interacting with it. "In comparison with reporter-led stories, character-led stories provide a significantly greater sense of atmosphere and emotion."[12]

In an extensive recent study on the relationship between space and emotional engagement in VR journalism, Kukkakorpi and Pantti identified three levels in which the sense of place evoked emotional involvement in the viewer. Figure 2 represents an important instrument in assessing emotional engagement based on the viewer's relationship with the virtual space.

The first level that can evoke involvement is the *dialogue with space.* Through the *transition between places*, *subjective interpretation*, and the *point of view* (POV), the viewer gains a perspective that enables him to follow the events while developing his understandings of the place.

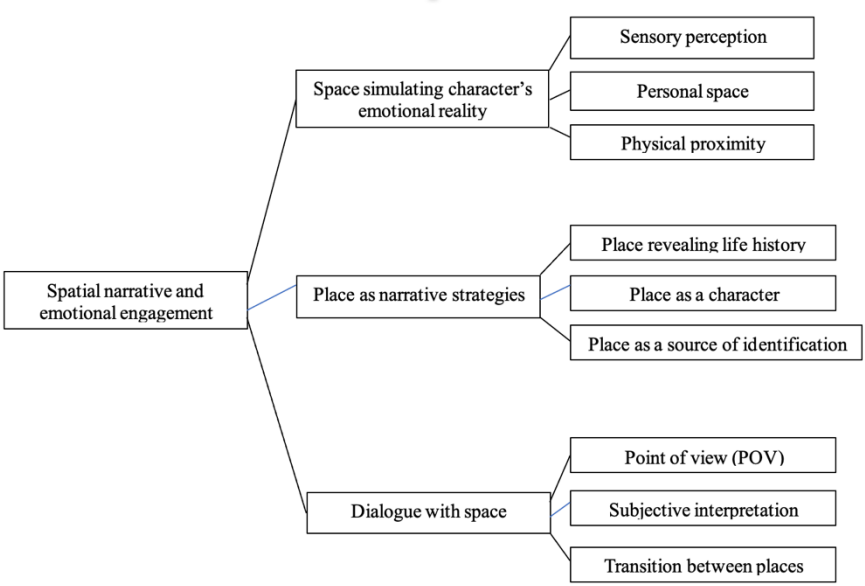

Figure 2. *Three levels of emotional engagement based on the sense of space. [Kukkakorpi and Pantti, 2020, p.14]*

The second level is using places as *narrative strategies.* The environment tells the history of the site while laying the ground for the unfolding story. At this level, the place can be *a source of identification* - especially the public areas that carry the institution's character and function. *A site can also be a character*, a subject in the story, provided with deep meaning and significance. *The place is also revealing the life history* and can define a flashback to another moment in time.

The third level in which space can evoke emotion in the VR viewer simulates *the character's emotional reality*. The *personal space* - described by the lighting techniques, the sense of limitation when the camera is in a narrow area, or the sudden appearance of an object - is a powerful emotional response source. The *viewer's physical proximity* to emotional response sources (like injured people, graveyards, or other negative triggers) represents another technique

used in VR journalism.

The study was limited to 360-degrees video VRNF productions. However, the three levels in which the sense of place evoked emotional engagement identified in the study represent a relevant analysis instrument for all types of VR productions.

4. Immersion

There is a blurred boundary between VR journalism and VR documentary, as each uses techniques specific to the other genre. The emphasis on the main character – the viewer itself – and his point of view in the story, a place reserved in the documentary for the filmmaker, is a technique meant to create emotion through immersion, presence, and agency.

Nillson & all presents a review of several definitions of immersion identified in the literature in areas such as literature, psychology, video games, or journalism, published in the last two decades, identifying four types of immersion.

The first type is *immersion as a property of the system*. This type of immersion is determined by the technology used, both in terms of VR devices used (HMD or haptics) and the built virtual environment.

The second type, *immersion as a perceptual response,* results when as many senses as possible are blocked from the outside world while increasing the means of perceiving the virtual world through haptic or visual devices (virtual glasses, gloves, headphones). Under both definitions, "immersion may be closely connected to media form, that is, the properties of the technological system used to mediate the experience," concludes Nillson&all[13].

Immersion as a response to narratives is the sensation one feels when being absorbed by the fictional or non-fictional story, worlds, or characters. Temporal, spatial, and emotional immersion - subcategories of responses to narratives - define the degree of absorption with the story, the space, and the characters from that space.

Finally, *immersion as a response to challenges* is found in interactive productions and relates to the viewer's agency. It involves its ability and willingness to engage with the environment, characters, and the narrative. "The types of immersion outlined in this subsection may be characterized by intense focus and attention brought about by the need for physical reactions to occurring obstacles or cognitive demands."

5. Case study. Rebuilding Notre Dame

Notre Dame Cathedral is a VR documentary[14] made by Ubisoft for Oculus, telling the story of the Paris Cathedral's reconstruction, partially destroyed by the fire of 2019. The documentary was filmed with 360-degree cameras and is representative of the best style of a television documentary. It also represents an excellent example of VR production, which, adapting traditional television techniques to VR technology, uses new stylistic means specific to the new environment.

The project begins with an overwhelming drone image that offers a spectacular view of Paris and the devastation caused by the fire on Notre Dame Cathedral's roof-top. The floating sensation triggers a first dizziness sensation due to the lack of reference points like body parts – suggesting the body floating in the air – or any technological devices identifying the drone. The sensations dissipate as the view changes to human height on the ground level and gets accustomed to the environment.

The film is not interactive but allows 360-degree viewing of images from outside and inside the Cathedral, realistically recreating a visitor's experience. With the Seine bank and the adjacent streets, the outer frames follow the images from the drone. Quite suddenly, the spectator finds himself teleported in a library where he faces the Cathedral's rector who – looking directly into the eyes of the visitor – tells his personal story. The posture, the engaging look, and the intentional tone focused on the interlocutor compels one to resist the temptation to look around, although possible. The instinctive behavior is to pay attention in turn, looking into the eyes of the character. This

cinematic technique – successfully used in other interviews such as the one in the office of the Paris City Hall or with the architect responsible for the restoration work – creates the feeling of presence, connection with the character's personal space and his story, and engagement in exploring the entire space.

In this production, the Cathedral is a character itself, presenting the place from centuries ago of glorious past to the tragic fire. The place itself is narrating the story, the human character merely integrating himself in the fabric of time and space. Images of recent celebrations from just months before the fire are superposed on top of partial ruins, laying the ground for the hope of the future after restoration.

In the end, we are being transported again in the panoramic view from the drone, with one more chance to take in the breathtaking view of Paris, confident that Notre Dame Cathedral will preserve its place in history for generations to come.

Visiting sites and museums in virtual reality has increased exponentially due to the pandemic and travelers' impossibility of visiting touristic and cultural locations. Rebuilding Notre Dame was viewed by over 10 000 visitors in the first month since being launched. There is a goal of reaching 100 000 people and a portion of ticket sales towards the cathedral reconstruction. Other cultural sites express a similar interest in offering a different visitor experience as VR could offer something complimentary.

6. Conclusions

Virtual reality is a technology that is claiming an increasingly important place in the gallery of media genres and will remain with us for a long time to come. There is a wide range of applications in non-fiction narrative and education, health, science, and many other areas of life.

The production of media content for new media platforms and virtual reality devices raises several new issues related to the visual

language's grammar, requiring the understanding and application of additional techniques in visual narration.

The quality of production will be directly proportional to the director's ability to create interactive, immersive experiences, engaging the viewer in the story. We have presented only some of the techniques that lay the foundations of acceptable practices in creating VR content. At the same time, they draw attention to the importance of expanding the study of visual language to complete the picture of virtual reality, most likely the future's reality.

The study also allows the conclusion that virtual reality is a technique with a strong persuasive potential, which, used correctly, can draw attention to significant problems in society, increasing empathy and producing results. Like any other immersive media, virtual reality storytelling can also be addictive. It can create a detachment from reality while also triggering other psychological reactions that can be both positive and negative potential, very well worth investigating in future studies.

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Notes:

[1] VR – defined as an artificial environment experienced by sensory stimuli (such as views and sounds) provided by a computer and in which one's actions partially determine what happens in the environment (Webster's dictionary)

[2] Ilker Koksal, 209, "Video Gaming Industry& Its Revenue Shift", *Forbes Magazine*, nov. 8.

[3] **AR – Augmented Reality** – the experience of visualizing the real environment with a computer-generated overlay, visualized through an app

running on a mobile device (phone or tablet). Ex. Ikea app, Rolex app, eyeglasses.

[4] **MR – Mixed Reality** – an enhanced AR experience where people can interact in the real world with virtual objects as if they were real.

[5] **XR – Extended Reality** – all real-and-virtual-combined environments and human-computer-interaction generated by computer technology and wearables, where the "X" represents a variable for any current or future spatial computing technology.

[6] Chris Bevan and David Green, 2018, „A mediography of virtual reality non fiction: Insights and future directions" in *Proceedings of the 2018 ACM International Conference on Interactive Experiences for TV and Online Video - TVX '18*, pp. 161–66

[7] *Immersive journalism* places the viewer in the center of the story, using specific digital technology, sometimes enabling direct interaction with the virtual environment

[8] *Immersion journalism* refers to a reporting style that places the journalist in the middle of events

[9] Nonny dela Pena, et all, 2010, „Immersive Journalism: Immersive Virtual Reality for the First-Person Experience of News", *Presence: Teleoperators and Virtual Environments*, Vol.19/4, 291-301

[10] Hollis Kool, 2016, "The Ethics of Immersive Journalism: A Rhetorical Analysis of News Storytelling with Virtual Reality Technology." *Intersect*, vol. 9, no. 3, 1–11.

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[12] Mariia Kukkakorpi and Mervi Pantti, 2020, "A Sense of Place: VR Journalism and Emotional Engagement." Journalism Practice 0 (0): 4.

[13] Niels Christian Nilsson, Rolf Nordahl, and Stefania Serafin, 2016, "Immersion Revisited: A Review of Existing Definitions of Immersion and Their Relation to Different Theories of Presence." *Human Technology* 12 (2): 112.

[14] Anna Sansom, 2020, "New VR Experience Recreates Notre Dame in Its Former Glory—and after Its Devastating Fire | The Art Newspaper." *The Art Newspaper*, 14 Aug.

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