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# THEORETICAL MODEL FOR VIRTUAL REALITY JOURNALISM RESEARCH (MVRJR):

## the user's journey through an immersive news experience

JUAN CAMILO HERNÁNDEZ-RODRÍGUEZ
*Universidad de La Sabana, Chía - Cundinamarca - Colombia*
*ORCID: 0000-0002-1524-6885*

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**ABSTRACT –** Virtual reality (VR) journalism promises to impact the cognitive, affective and behavioral faculties of audiences. However, research on VR journalism does not have its own theoretical frameworks. Therefore, this article proposes a model, the MIPRV, which integrates the Uses and Gratifications Theory (U&G), Affordances, and the Expectation-Confirmation Model (ECT) to analyze the three stages of the 'journey' (separation, immersion and return) that a user experiences when exposed to a VR news story. The model achieves, in addition to rereading in light of the ethical and normative principles of journalism several of the concepts associated with VR (e.g., presence, embodiment, empathy, etc.), formulating affordances (e.g., storyliving) and gratifications/effects unique to non-fiction stories (e.g., news values and framing, authenticity of the news events and content credibility, knowledge and understanding of the event).
**Key words:** Theoretical model. Virtual reality journalism. Uses and gratifications. Affordances. Expectation-confirmation model.


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## MODELO TEÓRICO PARA PESQUISA DE JORNALISMO DE REALIDADE VIRTUAL (MIPRV): a jornada do usuário por uma experiência de informação imersiva

**RESUMO –** O jornalismo de realidade virtual (RV) promete impactar, mais ou menos, as faculdades cognitivas, afetivas e comportamentais das audiências. No entanto, a pesquisa sobre jornalismo de realidade virtual não possui quadros teóricos próprios. Portanto, este artigo propõe um modelo, o MIPRV, que integra Usos e Gratificações (U&G), Potencialidades Tecnológicas da mídia (*affordances*, em inglês) e o Modelo de Confirmação de Expectativas (ECT, em inglês) para analisar as três etapas da 'jornada' (separação, imersão e retorno) que experimenta um usuário quando exposto a uma notícia de RV. O modelo consegue, além de reler à luz dos princípios éticos e normativos do jornalismo, vários dos conceitos associados à RV (por exemplo, presença, corporificação, empatia, etc.), formular potencialidades tecnológicas (por exemplo, storyliving) e gratificações/efeitos exclusivo para histórias de não ficção (por exemplo, valores e enquadramento da notícia, autenticidade do fato e credibilidade do conteúdo, conhecimento e compreensão do evento).
**Palavras-chave:** Modelo teórico. Jornalismo de realidade virtual. Usos e gratificações. Potencialidades tecnológicas. Modelo de confirmação de expectativas.

## MODELO TEÓRICO PARA LA INVESTIGACIÓN DEL PERIODISMO DE REALIDAD VIRTUAL(MIPRV): el viaje del usuario por una experiencia informativa inmersiva

**RESUMEN –** El periodismo de realidad virtual (RV) promete impactar, más o menos, las facultades cognitivas, afectivas y conductuales de las audiencias. Su investigación, empero, carece de modelos teóricos propios. En este artículo se propone un modelo, el MIPRV, que integra las teorías de Usos y Gratificaciones (U&G), de Potencialidades tecnológicas de los medios (*affordances*, en inglés) y el Modelo de Confirmación de Expectativas (MCE) para analizar las tres etapas del 'viaje' (separación, inmersión y retorno) que experimenta un usuario al exponerse a una historia periodística de RV. El modelo consigue, además de releer a la luz de los principios éticos y normativos del periodismo varios de los conceptos asociados a la RV (ej.: presencia, encarnación, empatía, etc.), formular potencialidades tecnológicas (ej.: narrativa viva) y gratificaciones/efectos exclusivos de los relatos de no ficción (ej.: valores y encuadres informativos, autenticidad del acontecimiento noticioso y credibilidad en el contenido, conocimiento y comprensión del acontecimiento).
**Palabras clave:** Modelo teórico. Periodismo de realidad virtual. Usos y gratificaciones. Potencialidades tecnológicas. Modelo de confirmación de expectativas.

## 1 Introduction

"The metaverse is the next evolution of social connection". This provocative statement has been prominently featured on Facebook parent company Meta Platforms Inc.'s website since October 2021, when Mark Zuckerberg, the company's founder, chairman, and CEO, announced that the company would reposition itself around the metaverse, which he has described as the successor

to today's internet with immersive virtual universes or environments in which the mediation of augmented reality (AR) and virtual reality (VR) technologies will facilitate socialization, learning, collaboration, and leisure (Meta, 2023).

Researchers believe that VR in particular marks "a turning point in the history of media [...], as it has the power to change the way we communicate, connect, and tell stories" (Costa & Brazil, 2017, p. 159). This scenario is especially promising for the field of journalism, where an area of academic research and news media production and innovation, dubbed virtual reality journalism, has developed (Owen et al., 2015; Pavlik, 2020). VR journalism is expected to represent, among other things, an opportunity to reconnect citizens who have lost interest and trust in news content (Greber et al., 2023; Lecheler, 2020) by offering to satisfy their long-standing desire to "transport themselves" to the locations of public events (Baía & Vasconcelos, 2018; Pérez-Seijo et al., 2022).

Along these lines, the objective of this article is to propose a theoretical model for research on virtual reality journalism, called Model for Virtual Reality Journalism Research –MVRJR– (or MIPRV, by its acronym in Spanish), based on the integration of the theories: uses and gratifications (U&G), technological affordances, and the expectation confirmation model (ECT). The model holistically articulates the user's experience before, during, and after exposure to an immersive non-fiction story as if it were a three-stage journey and identifies the conceptual variables of each stage.

## 2 Virtual reality in journalism

One of the contributions that this article aspires to make is to distinguish between immersive journalism and VR journalism, because, as Vicente and Pérez-Seijo (2022) point out, these terms have been erroneously used as synonyms.

In this context, immersive journalism encompasses technologies and narratives ranging from interactive multimedia reporting (or documentaries), binaural audio, and AR to mixed reality (MR). It is not exclusively a visual disciplinary field and doesn't necessarily isolate the user from his or her physical or material world. Instead, VR journalism creates a synthetic world using 360-degree video and/or computer-generated imagery (CGI) that simulates


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the conditions of the material environment in real time. Secondly, it immerses the user in that world using VR headsets or goggles (HMD) and other haptic devices and/or rooms or automatic virtual environments (CAVE) through which the device detaches the user from the physical world (Cotton, 2021; Owen et al., 2015). The synthetic universe is, definitively, a three-dimensional space that offers a rich immersive experience of perceptual, sensory, and motor order (Baía & Vasconcelos, 2018; Burdea & Coiffet, 2003; Rauschnabel et al., 2022).

Some researchers have highlighted the need to expand scientific study on the intersection between journalism and virtual reality and formulate theoretical approaches to analyze this confluence (Baía & Vasconcelos, 2018; Burdea & Coiffet, 2003). In this direction, Paíno and Rodríguez (2019) proposed individual and multiuser communication models for virtual environments that contrast with classical models of the interpersonal and mediated communication process. They also proposed a structure for VR news stories to replace the traditional inverted pyramid, which in turn reconsidered the notions of the "5Ws".

Two more models are important to mention, although they also include AR technologies. Hardee and McMahan (2017) proposed a theoretical construct to help journalists and developers understand the intersection between the fundamentals of immersion, immersive technologies, journalism principles, and types of journalistic stories. This led to the establishment of four typologies of immersive journalism. In addition, De Bruin et al. (2020) proposed a model to show the relationship between the elements stimulated by the journalist to generate immersion (use of technologies, narrative features, and interactive forms) and their effects on the user (sense of presence, emotional engagement, knowledge, and attitude).

Thus, MVRJR aims to contribute to bridging the epistemological gap in VR journalism by providing: a) a theoretical framework focused on the user's informative experience; b) providing a theoretical framework informed by the integration of the U&G, technological affordances, and ECT theories; c) the classification of different conceptual variables — some of which have been previously mentioned without distinction — into conditioning factors, technological affordances, and final effects; d) the formulation of variables exclusive to journalistic stories (e.g., news values and news framing, the authenticity of the news events, and content credibility); and e) the re-interpretation of other variables shared with

fictional stories (e.g. presence, embodiment, empathy, etc.) in light of journalistic fundamentals.

## 3 Theoretical frameworks underpinning the model

### 3.1 Uses and gratifications theory (U&G)

Uses and gratifications theory (U&G) is one of the "evergreen theories" of communication. For decades, researchers have found it to be a relevant and suitable framework for studying how and why audiences choose to use some media over others (Vorderer et al., 2020). Unlike functionalist postulates, U&G attributes greater capacity for analysis, autonomy, and participation to audiences in the selection and consumption of media and content, and recently has taken into account the impact of social and personal contexts on the expectations and decisions of audiences (Rubin, 2009).

First, U&G investigates the motivations or needs that incite audiences to select a particular media or content. In this theory, this is known as gratifications sought (GS) (Palmgreen & Rayburn, 1982). These initial gratifications or expectations are, in turn, conditioned or permeated by the personal and contextual traits of the target audience. Katz et al. (1973) propose classifying GS into five categories: cognitive, affective, personal relationship, social relationship, and tension release (entertainment). These same GS were recently taken up and confirmed by Rauschnabel (2018) as anticipated or expected gains when using immersive technologies such as AR glasses.

Second, U&G looks at the gratifications obtained (GO) by audiences after using a specific medium or consuming specific content (Palmgreen & Rayburn, 1982). These are the gains received after experiencing, for example, immersion in a journalistic VR product. In this regard, and as far as is known, Nielsen and Sheets (2019) have been the only scholars to postulate the following GOs in this field: experiential (immersion and narrative transportation), affective (emotion and empathy), and agency or control (controlling the experience and obtaining/simplifying information).

After the theoretical construction of U&G by Katz and colleagues in 1973, researchers Lichtenstein and Rosenfeld (1983) noted that gratifications do not only arise from the ontological needs of audiences but also from the expectations generated by


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the technological attributes of the media themselves. Sundar and Limperos (2013) point out that the characteristics of a technology modify and even create new gratifications. Therefore, they proposed studying the uses and gratifications of media from and in articulation with the conceptual framework of so-called technological affordances.

### 3.2 Theory of technological affordances

In cognitive psychology, the term "affordances" was first used by Gibson (1978) to refer to the possibilities of action that environments or ecosystems, and their respective conditions, to the different organisms that inhabit them, including human beings. Gibson emphasizes that these possibilities or attributes are altered according to the organism (and its characteristics) with which they come into contact. Years later, Norman (1990) incorporated the concept of affordances into the field of human-computer interaction (HCI); this was done to account for the properties of interfaces that communicate to users the possible functions or actions of a technology.

Technological affordances do not exist per se or independently of the actors inhabiting a media environment (Steffen et al., 2019). "Any study of technology must also include an examination of the users, their abilities, and their motives or goals in implementing a technology" (p. 692). Moreover, an examination of the context or contexts surrounding the user should also be included (Shin, 2017). The theory of technological affordances guarantees a relational reflection between the object (technology) and the subject (the user) before the consumption of a medium (Ostern & Rosemann, 2021). In addition, the user's engagement with a technology's affordances will have consequences for his or her knowledge, attitudes, and behaviors, according to the theory of interactive media effects (TIME) — an evolution of the affordances approach proposed by Sundar et al. (2015) to be applied to digital media.

Although Flach and Holden (1998) recommended using the theory of technological affordances to study VR more than two decades ago, its application is only beginning. One of the pioneering research studies is Shin (2017), which shows that the affordances of virtual environments are achieved "through users' action and interaction with technologies" (p. 1.834). Along the same lines, Shin points out that the affordances of VR are technological (immersion and presence)

and affective (empathy and embodiment). Another pioneering study is Steffen et al. (2019), which emphasizes that the affordances approach was originally applied to the analysis of "environments" and is therefore appropriate for the study of technology (VR) capable of virtually creating or modifying environments and recreating existing features of the physical environment.

### 3.3 Expectation Confirmation Model (ECM)

Satisfaction or the feeling of fulfillment is a key concept in U&G. It is achieved when the communication medium that the person has chosen to use largely fulfills or exceeds his or her GS. Otherwise, the user will feel disappointed and will stop using that medium and look for a functional alternative that he or she considers can meet his or her expectations (Palmgreen & Rayburn, 1982).

From the perspective of the ECM, satisfaction is defined as the users' subsequent evaluation of their overall experience with a specific information system or service (Bhattacherjee, 2001). Satisfaction can be equally translated into a positive emotional state (being satisfied) or an apathetic/negative state (being dissatisfied) (Shin & Biocca, 2018). Various studies have demonstrated the causal link between satisfaction and the continued use of technology (Liou et al., 2015), which has also been shown to hold for immersive devices (Bujić, 2021).

In the context of immersive journalism, Shin and Biocca (2018) have empirically tested the validity of the ECM and emphasized that features specific to virtual immersion such as a sense of embodiment and empathy are key determinants of satisfaction when consuming VR news products and affect future intention to reuse. Bujić (2021) reaffirms that the greater the degree of immersion provided by a technology, the higher the person's satisfaction and desire to be exposed to such an experience again. However, she warns that this could be biased by the "novelty effect" that VR still offers. Additionally, Bujić states that not all journalistic content is well received by audiences in VR formats.


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## 4 Model for Virtual Reality Journalism Research (MVRJR)

After multiple different definitions in the field of VR and journalism, immersion will be understood in this paper as "a form of awareness from one perspective, the degree of which reflects the intensity of their cognitive, emotional, and sensory connection to both the content and the form of technology" (Andre et al., 2014[1], as cited in Shin & Biocca, 2018, p. 2.817). Therefore, the user's immersive experience is better characterized as "an interactive and ongoing procedural aspect, rather than a static or consequential factor" (Shin & Biocca, 2018, p. 2.815).

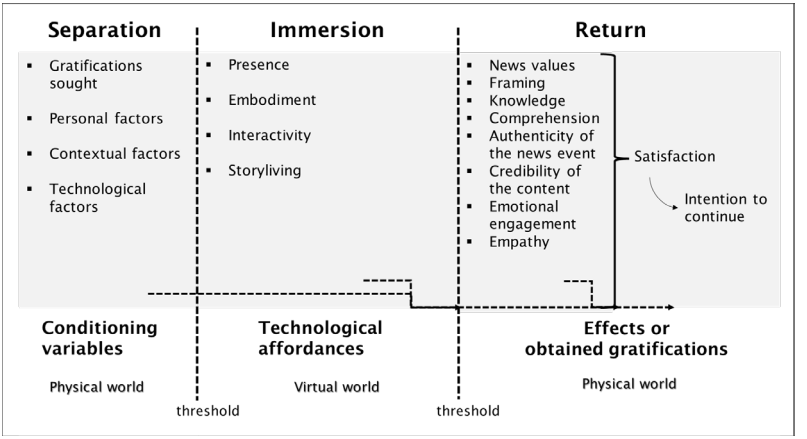
Immersion in journalism, by way of analogy, is a roundtrip "journey" between physical and virtual realities (Costa & Brazil, 2017). The journey analogy is at the core of transportation theory, formulated by Gerrig (1993), which has been used to explain the effects of narratives on human beings for decades. Gerrig's postulate reads:

> Someone ('the traveler') is transported by some means of transportation as a result of performing certain actions. The traveler goes some distance from his or her world of origin, which makes some aspects of the world of origin inaccessible. The traveler returns to the world of origin, somewhat changed by the journey. (Gerrig, 1993, pp. 10-11).

In light of this, three stages in the narrative journey, or immersive process, can be identified: before, during, and after the experience. Applying Gerrig's illustration to VR journalism, the first moment involves the user — equipped with his or her expectations (or desired gratifications), personal traits and context — separating from or leaving his or her world of origin (the physical environment) using one or several means of transportation (e.g., VR goggles, haptic devices). The second moment is when the user enters the virtual or synthetic world, immersing him or herself in the journalistic story to varying extents. The third moment is the equivalent of the user's return to his or her world of origin, presumably with cognitive, emotional, and behavioral changes (see Figure 1).

**Figure 1**

*A user's immersive journey in a virtual reality journalism story*




### 4.1 Stage one: separation

During the first phase, the user must decide whether or not to expose themselves to a VR journalism experience. The level of immersion that the user experiences largely depends on their willingness to engage with the narrative (Costa & Brasil, 2017). Shin and Biocca (2018) state that "VR stories are viewed and accepted based on the manner that users imagine them and desire to experience them" (p. 2.802). If the user decides to proceed with the experience, they will be separated from the physical environment and transported into a virtual one. This separation involves isolation from the material world, but it does not entail a loss of personal or contextual dimensions. On the contrary, these variables, along with the GS and the predefined technological characteristics of VR devices, become conditioning factors that will later affect the immersive experience.

Among the personal factors that may impact the experience are gender and age, familiarity with VR technologies, beliefs, and mood (Rauschnabel, 2018). Furthermore, if we delve deeper into reflection, the user's criteria for choosing some media over others to inform themselves should be considered. According to selective exposure theories, this choice may be influenced by the user's judgments on the quality and usefulness of the information, the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importance or relevance of the topics covered, and the informational benefits of a specific platform or medium, among others.

In terms of contextual factors, the degree of education, socioeconomic status and lifestyle, cultural customs, membership in social groups, and the influence of these factors on the use and consumption of VR, among others, can be included (Da Silva, 2021; Rauschnabel, 2018). In addition, media agendas in the area where the user lives can lead him/her to consume a specific type of content using VR devices.

The technological factors that exist before immersion are the very features that VR devices are equipped with. These include a) the type of device (HMD viewers, haptic suits, CAVE); b) the type of integrated multimedia (image, sound, text, odor simulation, etc.); c) the quality of the multimedia components (monoscopic or stereoscopic video; stereo or spatial audio); and d) the correspondence between the information "displayed" by the device and the movements made by the user in the simulated space (De Bruin et al., 2020).

Finally, GS refer to the expectations that a user has when using a particular medium and consuming its content, according to the U&G theory. These expectations may be cognitive; affective; and related to personal and social relatedness, and stress release, as originally proposed by Katz et al. (1973) and recently endorsed by Rauschnabel (2018). Literature in the field of VR suggests that users turn to VR because they expect it to enable them to "afford activities that are impossible or advantageous when compared to the activities afforded by physical reality" (Steffen et al., 2019, p. 685).

### 4.2 Stage two: immersion

Immersion is a rather dynamic process and cannot be activated mechanically. Rather, users reconstruct it ecologically when their conditioning factors come into contact with the technological affordances inherent to VR (Shin, 2017; Shin & Biocca, 2018).

The first affordance suggested by MVRJR is presence, which refers to a psychological state. This state is the result of what Slater (2009) has termed the place illusion (PI) and the plausibility illusion (Psi). The former refers to the sensation of "being there", the illusion that the virtual world is the real world. The latter is the illusion that the depicted scenario is "happening" or occurring in real time.

The affordance of presence represents a particular dichotomy for journalism. On the one hand, it breaks down the barriers of time and space (Herrera & Benítez, 2022; Zhuang & Liang, 2023), allowing users to transport themselves to the epicenter of a news event regardless of time, territorial, or cultural distance. This could affect the concept of "proximity" within the framework of news values, which both reporters and audiences use to determine the relevance of a news event (Kukkakorpi & Pantti, 2020). At the same time, the perceived proximity to the event could trigger varying levels of empathy toward the topic and its protagonists on the part of the user (Baía et al., 2023). On the other hand, any attempt to "simulate" physical reality and its conditions in an artificial environment is contrary to the principles of accuracy and transparency when reporting events (Aitamurto, 2023; Kovach & Rosenstiel, 2012). However, it is worth clarifying that journalism aims to reconstruct and interpret reality, not to replicate it, as this is humanly and technologically impossible (Yanes Mesa, 2006).

Another affordance is embodiment, which is understood as the process of replacing a person's body with a virtual one and generating an "illusion of body ownership" within the synthetic environment (Slater & Sánchez-Vives, 2016). The virtual body is a focal point where the IP and Psi, discussed earlier, merge (Slater, 2009). It so happens that "virtual environments are not purely imaginal; we experience them through our bodily senses, and in this way they are also real in the sense of the lived world" (Morie, 2007, p. 107).

The illusion of body ownership is represented graphically, though not necessarily with an avatar. The avatar allows the user to navigate or move "freely" through the three-dimensional virtual environment, experiencing while experiencing that the action and motor control of his or her physical body match those of the avatar (Dincelli & Yayla, 2022; Kokkinara & Slater, 2014). While this potential of VR has been applauded in principle by user experience experts, it may be viewed with skepticism among reporters. Including a graphical representation of the user in a news scene that he or she was not part of could be seen as integrating "fiction" into the journalistic story and, consequently, manipulating it (Steinfeld, 2023).

A third affordance is interactivity, which in the case of VR refers to the degree to which "users can participate in modifying the form and content of a mediated environment in real time" (Steuer, 1992, p. 14). Therefore, researchers distinguish between technological interactivity and narrative interactivity (de Bruin et al., 2020; Hassan,


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2020). Technological interactivity refers to actions that the device allows users to perform (e.g., manipulating synthetic objects) and the way it reacts in real time to user commands dictated by their own body while using haptic devices (Ruggiero, 2000). Narrative interactivity, on the other hand, describes whether the story (and its structure) allows the user to alter its pace or even its course (Vázquez-Herrero & de Haan, 2022). In addition to these two types of interactivity, it is necessary to include interactivity between avatars; that is, the social relationship between two or more users in the virtual news environment, which has not yet been developed for long-form journalistic stories in virtual reality, unlike live coverage of events or live interviews.

The implications of narrative interactivity fuel particularly interesting journalistic debates. The role of the newsmaker that has traditionally been reserved for the journalist would be diluted by giving the user agency or control over the construction/modification of a news story (Pérez-Seijo et al., 2022; Vázquez-Herrero & de Haan, 2022). Virtual reality would bring user participation to its peak. Users would go from being passive consumers and spectators to privileged witnesses and, even, actors or protagonists/victims of news events (Herrera & Benítez, 2022; Steinfeld, 2023). However, this potential user agency, depending on its scope, could alter or even distort the facts and the way in which they occurred.

Finally, returning to the idea of Baía et al. (2023) that immersive journalism represented a transition from the storytelling paradigm to the storyliving paradigm, MVRJR proposes to highlight the concept of "storyliving" as a technological affordance of VR journalism, which contributes to users having strong emotional experiences. "The audience learns through engagement and embodiment, by entering into a scene, inhabiting a digital entity, and experiencing what it knows. Viewers experience the story as though they lived it" (Maschio, 2017, p. 9).

The concept of storyliving in immersive journalism is characterized by three key features. Firstly, it is nonlinear, which frees the user from having to navigate the story in a single, predefined sequence. Secondly, it is multisensory, aiming to engage the senses of sight, hearing, and touch, and potentially those of smell and taste in the future. Thirdly, it is dynamic and interactive, like the concept of interactivity, behaving as an evolving organism that is configured and reconfigured with the user's participation. Artificial Intelligence (AI) developers believe that, for example, the use of deep neural networks will enable the user to take full advantage of storyliving in the future (Vallance & Towndrow, 2022).

### 4.3 Stage three: the return

Upon returning from immersion, the user may report a "personal transformation" to a greater or lesser degree (Costa & Brazil, 2017) thanks to being "crossed" by the sensations of presence and embodiment, as well as the interactivity and storyliving of the journalistic product. This would be possible because narratives, regardless of their nature, have an impact in some way on the user's attitudes, beliefs, and behaviors and do so immediately in the medium and long term. This is what is known in U&G as gratifications obtained (GO) after the consumption of a medium. It should be noted, of course, that the effects of technology are not infallible or direct on audiences; rather, they are negotiated or transactional effects (Vorderer et al., 2020).

MVRJR suggests first evaluating whether the audience recognizes the enhancement of some news values and frames as rewarding after being exposed to a VR story. Events are considered newsworthy if they are of public interest (Kovach & Rosenstiel, 2012). Such events are both a) selected based on the so-called criteria of newsworthiness (Harcup & O'Neill, 2017), and b) reconstructed within conceptual frameworks that highlight one part of reality and leave out others (Scheufele, 1999).

From this perspective, researchers initially believed that values and frames were tools exclusive to journalists and media outlets to shape their news agendas. However, over time, it was shown that audiences also use them as "cognitive cues" or clues that guide and focus their attention on certain events (Lecheler & de Vreese, 2019; Paulussen & Van Aelst, 2021). Even better, in their process of making sense of information, "users seem to utilize the same schemas employed by journalists to determine the relevance of an event" (García-Perdomo et al, 2017, p. 1.181).

It is interesting to analyze whether the user is gratified by news values such as impact, proximity, and personalization. Audiences build their notion of impact when they perceive the real or potential consequences of events as meaningful to their lives (Bednarek & Caple, 2017). They assign greater relevance to these according to their perceived proximity or distance, both geographically and culturally, to events; audiences in today's "global public sphere" are as interested in what is familiar or close to them as they are in what is strange and distant (Joye et al., 2016). Meanwhile, personalizing or putting a human face on the news facilitates users' identification with the story; the "ordinary people"


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and their views attract more attention to the news than the presentation of abstract processes (Bednarek & Caple, 2017; Bell, 1991).

Concerning news framing, it is necessary to ascertain whether specific perspectives are activated or "resonate" with users after immersion to interpret the facts. These frames may include a conflict frame, which emphasizes disagreement between people or organizations; an attribution-of-responsibility frame, which highlights the party responsible for causing or solving a problem; an economic consequences frame, which focuses on financial gains or losses; a morality frame, which emphasizes the normative, ethical, or religious lesson (Semetko & Valkenburg, 2000); a spectacle frame, which underscores drama or entertainment elements; a debate frame, which highlights arguments and reasons for the event (Hertog & McLeod, 2001); or a game frame, which highlights winners and losers as if it were a sporting event (Lawrence, 2010).

Another pair of effects include the potential improvement in the user's perception of the authenticity of the facts and the credibility of the information (or content). In both cases, the cornerstone of journalism is the backdrop: respect for the truth (Lopez, 1995). Truth, in this case, refers to the correspondence or relationship between what is reported and what happened at a given moment. The idea is that, without wasting the immersion offered by VR, the users are guaranteed a "full-disclosure, fair and balanced representation of what is ultimately a fact-based story" (Steinfeld, 2023, p. 56).

The authenticity of the news events refers to the degree of accuracy with which reality is reported. In this sense, journalistic images are intended to be "visual evidence" of the physical world, without ignoring that, in the case of virtual reality, the denotative aspect of an image (the factual) may be surpassed by the connotative aspect (the symbolic) (Aitamurto, 2023). For example, if an event is recorded in 360-degree video, it may not raise much suspicion about its accuracy, but if it is presented in CGI, doubts may arise about the accuracy with which an event or part of an event is represented.

Credibility, on the other hand, is "a feature attributed to individuals, institutions or their communicative products [...] by somebody [the audience in this case] with regard to something [the news event]" (Bentele & Seidenglanz, 2008, p. 49). In this particular case, credibility is understood as the degree of trust that one has in the content being presented (Metzger et al., 2003), which can be evaluated by assessing whether the story avoids intentional

simplifications and biases and presents a sufficient and balanced number of sources and points of view regarding the news event.

A third set of gratifications that MVRJR recommends studying is particularly cognitive in nature. On one hand, there is the acquisition of knowledge given that one of the tasks of journalism is to inform citizens about public affairs (Kovach & Rosenstiel, 2012), regardless of the formats used for this purpose. Some studies have shown that virtual reality has facilitated the acquisition of knowledge and learning about a particular field (Bailenson et al., 2008; Jou & Wang, 2013). However, "VR news content could increase cognitive load compared to tradition news content. This is because VR content is more vivid and interactive" (Jeong et al., 2020, p. 4) and therefore demands more cognitive resources from the individual to process the message.

On the other hand, there is the effect of comprehension, as contributing to citizens' better understanding of the world around them and their place in it is also at the core of journalism (Kovach & Rosenstiel, 2012). Comprehension refers to the process of reconstruction of meaning by the receiver of a message. It involves making sense of the message based on prior knowledge, experiences, and the users' context (their world) and their perspective of it (Cabrera-González, 2013). Similar to the previous gratification, measuring comprehension in the context of VR journalism has yielded mixed results (Barnidge et al., 2021; Barreda-Angeles et al., 2020; Erken & Birsen, 2021; S. Sundar et al., 2017).

The final set of potential effects — emotional engagement and empathy — are related, although not exclusively, to the so-called "emotional turn" in journalism studies; that is, in recent years there has been an increased interest in exploring emotion as an editorial strategy to reconnect with today's skeptical and fragmented audiences (Lecheler, 2020; Wahl-Jorgensen, 2020) without disregarding the controversy that this may entail for a profession that safeguards factual accuracy and strives to protect citizens from emotionally disturbing events (Aitamurto, 2023).

Emotional engagement has been defined as a complex system of feelings that affect both thinking and behavior (Myers, 2004). While acknowledging that this is not a complete definition, Ortony (2022) conceptualizes emotions as "intentional, valenced, conscious mental states" (p. 53). This means that emotions are about someone or something, are positive or negative, and are experienced. According to Fredrickson (1998), positive emotions (e.g., joy, acceptance, surprise, and hope) lead to a state of well-being and fulfillment in human beings and stimulate their personal and social skills. Negative emotions (e.g., sadness, fear,


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anger, and disgust) keep the subject alert and mobilize them to seek more information about a matter of concern (Thompson & Barton, 1994), but they can also lead them to avoid or deny certain topics or situations (Taylor et al., 2012[2], as cited in Salama & Aboukoura, 2018).

In this article, empathy is not only conceptualized as just an emotion, but rather as a human capacity with three dimensions: cognitive — also known as perspective-taking —, emotional or emotional convergence, and motivational — empathic response or action towards the well-being of others. All three result in neurocognitive components that interact and operate in parallel (Archer & Finger, 2018; Decety & Cowell, 2014; Janssen, 2012).

The pioneering experiments of De la Peña et al. (2010) suggested that virtual reality journalism could increase empathy in users, as these narratives offered them the opportunity to adopt a first-person point of view — a kind of embodiment — that would motivate their emotional involvement. Years later, it was claimed that VR could become an effective empathy machine (Milk, 2015). However, several critics of this stance have called for caution in overstating the power of immersive technologies to automatically make audiences "put themselves in the shoes" of the protagonists of news events (Sanchez, 2020).

### 4.4 Intention to continue use or consumption

Although the intention is part of the return phase, it deserves a separate chapter because of its attitudinal faculty par excellence. The intention to continue using (consuming) or recommending a VR story depends on the user's assessment of the satisfaction derived from the consumption of such content, taking into account both the conditioning variables (1st stage) and the technological affordances (2nd stage), as well as the effects just described (3rd stage). For instance, Mütterlein and Hess (2017) state that satisfaction with VR predicts intention to use, purchase, and recommend by word of mouth.

## 5 Conclusion

Immersive technologies, especially VR, are transforming people's conception of what they call reality and their notion of interaction with the environment, while also offering unexplored

possibilities for designing information and constructing narratives (Rubio-Tamayo et al., 2017) that allow greater participation to audiences, for instance, in news events. Hence the importance of proposing a theoretical model for VR journalism research (MVRJR) that conceptually groups the variables that condition, to a large extent, a user's exposure to VR journalistic content, the characteristics of their immersive experience due to the affordances offered by the technology itself, and the perceived effects after consuming non-fiction stories, all condensed into the analogy of a user's round-trip journey between the physical and virtual worlds.

This theoretical development, always open to further adjustments, is expected to contribute: firstly, to conceptually clarifying the various terms that have emerged in VR journalism and to classify them according to the stages of the immersive journey, and secondly, to encourage researchers in the field to design the methodological tools necessary to measure the theoretical variables that have been proposed in this article from an organic and holistic perspective. This will likely require a mix of qualitative and quantitative experimental techniques with physiological, cognitive, psychological, and neurological tests.

There is also an opportunity for further reflection from theoretical research. MVRJR has the limitation of focusing on the user's experience when consuming VR journalistic stories. Within this process, there is a notable omission of other actors such as journalists and their production team — audiovisual producers, animators, designers, and engineers, among other experts — who can imprint their own worldviews on technology and content, thereby disrupting the user's construction of meaning, as recognized by the theory of technological affordances.

MVRJR is just the beginning of a deep and long discussion about the future of journalism (and its relationship to audiences), including ethical and regulatory implications, that academics and industry members will have to engage in as VR and other similar technologies evolve and consolidate. Today, VR is synonymous with a simulated environment, but we must begin to understand it as "a three-dimensional, computer-generated, veridical environment" (Vallance & Towndrow, 2022, p. 1). Soon, thanks to artificial intelligence, the narrative experience will be fully immersive and allow journalism to not only connect a person to virtual content, but also encounter otherness in a synthetic environment with various layers of time, place, and action to interact with information (Vallance & Towndrow, 2022).


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**JUAN CAMILO HERNÁNDEZ-RODRÍGUEZ.** Assistant Professor and Ph.D. candidate in Communication at Universidad de La Sabana. He holds a Master's degree in journalism and digital Communication from the same institution. His research interests include audiences and disinformation, as well as the intersection between journalistic narratives, emerging technologies (virtual reality), and neuroscience. E-mail: juan.hernandez1@unisabana.edu.co

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