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Miscellaneous

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Analysis of the Level of Immersion of 360° Video Features Produced by Spanish Media

Abstract

This paper offers the results of a content analysis on the level of immersion in 360° video features produced by Spanish media. Unlike other conventional ways of storytelling, this new modality provides the viewer with a sensation of being really immerse in a reality that is only being represented, which favors a deeper and more meaningful understanding of it. Our study is divided in three sections. Firstly, we develop a brief theoretical framework that includes the definition and foundations on which immersive feature is based. From this theoretical foundation, we draw a scale to measure the immersion level of these pieces and we confront our proposal to the qualified assessment of 10 experts. Finally we apply this scale on a sample of 148 360° video features produced by Spanish media between January 2015 and December 2017. The aim is to analyze its use and also to infer some good practices that can be useful not only for scholars researching on this new format but also for practitioners producing it.

Keywords

Immersive storytelling, feature, 360° video, innovation, virtual reality, Spain.

1. Introduction

In the last five years, the impulse and convergence of a series of immersive technologies (Oculus, 2014, 2015; Google, 2015b, 2016) supported by large Internet platforms (Google, 2015a; Facebook, 2014, 2015) have fostered the appearance of a new kind of storytelling. It is based on the representation of a spherical setting which places the spectator at its center and offers a first-person viewpoint that can be controlled by moving and turning one's head as easily as one would do in a real environment. With the aid of a stereoscopic viewer, the spectator can immerse themselves in the story through a realistic, three-dimensional representation which offers a visual, auditory and even tactile experience (Pryor, 2010). At the same time, this representation is supported by the use of some aesthetic and interactive narrative resources which constitute the action between the spectator and the story (Domínguez, 2010). This new format has begun to be applied in different areas like education, real estate, tourism and advertising (Clark, 2015). Since 2015, it has also been used in journalism, which is the focus of this study.

Originally influenced by video games (Domínguez, 2010, 2013a, 2013b), narrative in 360° video differs from video games in that the spectator cannot participate in the course of the narration through the choice of actions. In 360° video, spectator interaction refers to the

spectator's possibility to accept the perspective previously chosen by a director or opt for a different one, place themselves in different parts of an event or even access additional information (Pryor, 2010).

Despite the limits of this interaction, control over the informative experience and the possibility to visualize a more complete context through a 360° setting present a series of features that we do not find in other conventional audiovisual media. The rupture of the limits of the traditionally fixed frame (Watson, 2017, p. 22; Marconi & Nakagawa, 2017, p. 3) allows the spectator to visualize the events in a 360° setting, which improves their informative experience. At the same time, this can translate to lending greater credibility to the events and can contribute to recovering audiences that are becoming more fragmented (Pavlik, 2005, p. 40), viral (Martínez Rodríguez & Torrado, 2017, p. 148) and inclined to receive information via mobile devices (Salaverría, 2015, p. 149). Nearly two decades ago, Biocca and Levy described the potential of these technologies as “the oldest dream of journalist to conquer time and space” for their ability to “create a sense on the part of audiences of being present at distance, newsworthy locations and events” (Biocca & Levy, 1995, p. 137).

The innovation that this new storytelling incorporates implies in turn a radical change in the technical devices used to record and edit content (Doyle *et al.*, 2016; Hardee & McMahan, 2017, p. 6), and in the presentation of the narrative structure (Lelyveld, 2015; Aronson-Rath *et al.* 2015). The number and depth of changes this method entails justifies the generation of studies that contribute to responding to the many questions it raises, whether about the use of the technologies it incorporates (Sirkkunen *et al.*, 2016) or the immersive rhetoric needed so that “the spectator feels they are in the reality transmitted and can act in it in some way” (Domínguez, 2013b, p. 300).

In this study, we focus on the second point, that is, on the use of different narrative resources that contribute to creating the illusion of finding oneself in the event narrated and which enable them to identify with the reality represented. In this regard, like Domínguez (2017, p. 4), we think it is not enough to use these immersive technologies (cameras, viewers, etc.) to achieve this representation. It is also necessary to know the features of the format and the influence of a series of narrative resources when placing the spectator in the center of the event as if they were another character.

2. Immersive journalism in 360° video: concept and evolution

In 2010, journalist and researcher Nonny De la Peña defined the concept of immersive journalism as “the production of news in a form in which people can gain first-person experiences of the events or situations described in news stories” (De la Peña *et al.*, 2010).

Despite having this first formal definition, we find difficulties when we try to delimit the study to the term “immersive,” which is not in the Dictionary of the Royal Academy of Spanish. That is why, as Domínguez notes (2013a, p. 9), it is necessary to address its origin from related terms like “immersion” or “immerse.” The latter, from the Latin *immersus*, refers to the idea of “being immersed in something,” be it a liquid, a specific setting or a real or imaginary environment.

The idea that this meaning holds has previously been used metaphorically in other narrative worlds like literature and cinema. It has tried to explain the cognitive process of the reader or spectator who is immersed in other worlds given to them through novels or films, respectively. Murray describes it as the experience of being transferred to a very elaborate, fictitious place where “a search similar to when we dive into the ocean or a pool: the sensation of being surrounded by a completely different reality [...] something that requires all of our attention and the concentration of our senses” occurs (Murray, 1997, p. 111).

Gerrig's theory of narrative transport attempts to explain the experience of the reader or spectator who “disappears” for hours in the narrative world of books and films on the basis of the metaphor of a journey in which someone is transported (Gerrig, 1993, p. 10). Following

this author, Green and Brock conceive this type of transport as “a distinct mental process, an integrative melding of attention, imagery and feelings [...] where all mental system and capacities focused on events occurring in the narrative” (Green & Brock, 2000, p. 701). Metaphorically, immersive journalism also constitutes a “journey” by the spectator to the interior of an event represented through a realistic setting of three-dimensional appearance. The journey is taken from a first-person perspective which allows them to experience a different representation of reality and understand it, therefore, in a different manner that would not be possible without really being there (De la Peña *et al.*, 2010, p. 300).

2.1. *Fundamentals of immersive journalism: presence and immersion*

Human perception in virtual or computer-generated settings is studied in the field of virtual reality. The concept of virtual reality is controversial and has been defined differently since the first studies appeared in the 1930s (Rheingold, 2002, p. 56). Thus, this concept has also been called artificial reality (Krueger, 1991, p. 7), virtual environment (Kalawsky, 1994; Sheridan & Zeltzer, 1994), virtual world (Quéau, 1995, p. 15), simulated environment and cyberspace (Biocca & Levy, 1995).

In 1989, Jaron Lanier introduced the term “virtual reality,” which has taken precedence over the others. Lanier, who founded the company VPL Research Inc., marketed the first models of gloves (*DataGloves*) and glasses (*EyePhones*), which most virtual reality researchers used in the 1990s. Lanier referred to this concept for the first time at the SIGGRAPH conference¹ in 1989 and defined it as “a simulation of reality that can surround a person that’s created with computerized clothing.”

This definition emphasizes the existence of two fundamental aspects: the perception of the simulated world through the senses that surround the person and the use of a system (clothing or stereoscopic helmets) equipped with technical characteristics that make this illusion possible. This illusion of a virtual or simulated reality is studied through the notion of presence or telepresence (Minsky, 1980, p. 45; Steuer, 1992; Lanier, 1992). The concept, which has been defined in many ways (Steuer, 1992, p. 104; Sheridan, 1992, p. 123; Heeter, 1992, p. 262; Lombard & Ditton, 1997; Lee, 2004, p. 32), corresponds to “the sensation of being in the virtual setting indicated by the way of responding to it as if it were real” (Slater *et al.*, 2009, p. 200). In the following table, we compile some of the most notable contributions of presence:

Table 1: Presence: concept and causes, according to different authors.

	Year	Concept	Factors
Steuer	1992	. The sense of being in an environment	. Medium’s vividness . Interactivity . Individual’s consciousness
Heeter	1992	. Subjective experience	. Personal presence . Social presence . Environmental presence
Sheridan	1992	. Subjective sensation, a mental manifestation	. Wide sensory information . Ability of the observer to modify his viewpoint . Ability to modify physical environment

¹ Founded in 1974, SIGGRAPH is the research group in infographic or graphic computing of the ACM and is also the name of the conference on the area organized by the SIGGRAPH research group.

Lombard and Ditton	1997	. Perceptual illusion of nonmediation in which the medium appears to become either invisible	. Realism . Immersion . Transportation . Social richness . Social actor within medium . Medium as social actor
Lee	2004	. Psychological state in which virtual objects are experienced as actual objects in either sensory or nonsensory ways	. Physical presence . Social presence . Self presence
Slater	2009	. The sense of being there signalled by people acting and responding realistically to virtual situations and events	. Consistent low latency sensorimotor loop between sensory data and proprioception . Statistical plausibility . Behaviour-response correlations

Source: Own elaboration.

As for the factors that contribute to generating presence in a virtual setting, Lombard and Ditton identify a series of different variables according to how they refer to the manner of presenting the information, its content and the characteristics of the user. We summarize its contribution in the following table:

Table 2: Causes of presence in a virtual environment.

Variables that generate presence	
Forms of showing information	
Visual	Image quality
	Image size
	Visual field
	Distance between screen and user
	Movement and color
	Dimensionality
	Subjective point of view
Audible	Quality
	Dimensionality
	Ambient sound and music
Interactive	User entries with response from the medium
	Modification of the mediated experience
	Amount of change possible in the setting
	Latency
Content of information	
	Illusion of being transported to the place of the events
	Social realism
	Use of media conventions
User characteristics	
	Willingness to suspend their disbelief
	Previous knowledge and experience of the medium

Source: Lombard & Ditton, 1997.

Analogically, in studying the determining factors of presence, other authors separate those related to the technological characteristics of the system that are aimed at making the medium as transparent as possible, (media form) from those related to the content (content factors), like the objects, actors and events represented in the narration (Ijsselsteijn *et al.*, 2000, p. 3960). Among the latter, Ijsselsteijn and his collaborators highlight the representation of the user or the virtual body in the setting represented, the autonomy of the environment, of both objects and agents and actors (Zeltzer, 1992), and the recognition of the user through the reactions of other actors (Heeter, 1992).

Sheridan's theory of interactivity proposes three factors when determining the sense of presence: the extent of sensory information in relation to the way the spectator perceives space; the control of relation of sensors to environment; and the ability to modify physical environment (Sheridan, 1992, p. 121-122). Following this author, Ryan starts with the confluence of these three factors to explain the existence of immersion and presence, although he distinguishes both concepts so that the first describes the world as a living space which provides a setting to the embodied subject, while presence confronts the subject as a recipient with individual objects. In this regard, the factors that determine the degree of interactivity of a system also contribute to its functioning as an immersive system (Ryan, 2004, p. 93).

In transferring this theory to 360° journalistic content, Domínguez highlights specific visual resources which foster immersion in a space. Among them are the transparency of the medium to hide any kind of mediation, the possibility to move in a 360° setting without distracting elements, the visual realism or hyperrealism of the setting, fluidity of movement to explore it and first-person ocularization (Domínguez, 2010).

2.2. *The first steps of immersive journalism in 360° video*

Although the study of immersive journalism is recent, there are different studies which have tried to standardize it, establishing different categories for its classification².

Beginning in 2007 and with her Emblematic group, De la Peña³ has produced a series of works about computer-generated environments (CGI). Some of them, like "Gone Gitmo" (2007) and "Cap & Trade" (2010), are framed in what the author considers "interactive journalism" or "low immersive journalism," as they can be visualized with a certain degree of choice by selecting actions or accessing photographs, documents and audiovisual material. Along with this level of immersion, De la Peña distinguishes a higher one that she calls "deep immersive journalism." Included in this group are projects like "The Ipspress Experience" (2009), "Hunger in Los Angeles" (2012) and "Project Syria" (2014), whose visualization requires a complex virtual reality system that transfers to the spectator "the sensation of place to a space where a credible action is taking place the they perceive as really happening, and where, most importantly, it is their body involved in this action" (De la Peña *et al.*, 2010, p. 299).

As we noted earlier, the evolution of 360° technology has made it easier to apply content based on immersive journalism through 360° video. It combines the use of low-cost stereoscopic viewers like Google Cardboard⁴, Google Daydream⁵, Samsung Gear VR⁶ and, more recently, the Oculus Go system⁷. Although their functioning is inspired by a series of largely unsuccessful devices linked to video games the 1990s⁸, the image quality, the response

² For more information on the first steps of immersive 360° video features, Benítez de Gracia and Herrera Damas (2018a) can be reviewed.

³ Nonny De la Peña's works can be reviewed at www.immersivejournalism.com.

⁴ See <https://vr.google.com/cardboard>.

⁵ See <https://vr.google.com/daydream>.

⁶ See www.samsung.com/es/wearables/gear-vr.

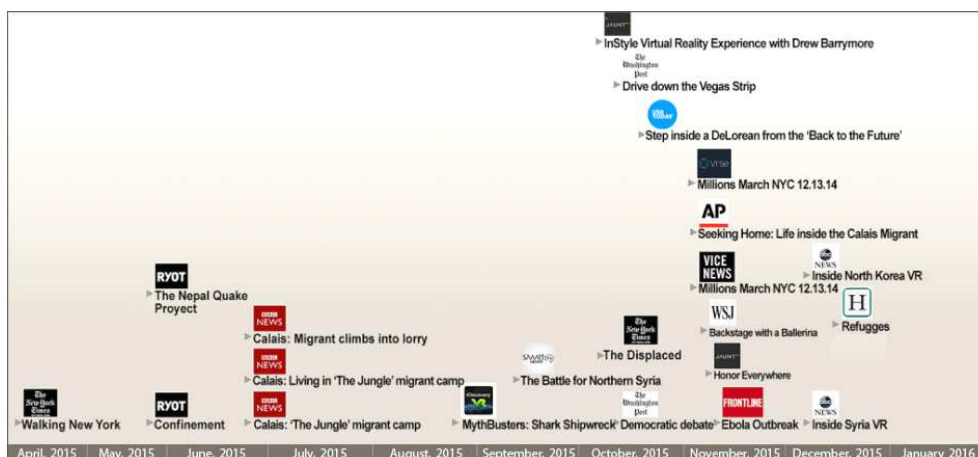
⁷ www.oculus.com/go.

⁸ Some of the initiatives that tried to popularize and commercialize virtual reality viewers and equipment in the videogame sector were the Sega VR Genesis console (1993), Reality +, from the company Virtual Images (1993), Virtual

to user movements, the dimensions and the weight of recent viewers overcome most of the limitations of the systems from that period. Based on the system of human vision, they consist of a light structure that is placed on one's head. It has two stereoscopic lenses which create an illusion of three-dimensional space. A mobile telephone is inserted into the lenses to see content on its screen. Although they are popularly known as virtual reality glasses, these systems are different. Both share the goal of "trying to convince us of the experience of another reality through perceptible elements" (Rheingold, 2002, p. 61). However, in virtual reality, the senses of sight, hearing, touch and smell all come into play, whereas in 360° video, the perception of the recreated setting comes only through sight and hearing.

In 2015, *The New York Times*, coinciding with the publication of its second⁹ 360° video work, "The Displaced"¹⁰, was the first news organization to distribute this kind of viewer, giving away more than a million Google Cardboards to its subscribers. Prompted by an internal innovation scheme (Abbruzzese, 2014), this newspaper has since November 2016 offered the channel "Daily 360°," whose goal is to produce this kind of content on a regular basis (Hardee & McMahan, 2017, p. 2). Along with this channel, in the United States there are 360° versions of *USA Today*, *The Wall Street Journal*, *The Washington Post*, *The New York Times*, Frontline, Discovery, CNET, VICE News and The Associated Press. There is also a group of producers that specialize in 360° video. They use their own platforms or applications to host and promote this type of video. This is the case of Within (former Vrse), Jaunt and Ryot.

Figure 1: Chronology of 360° video feature published in the U.S.A. by news media and specialized producers (2015).



Source: Own elaboration.

These 360° video feature share some elements with other genres and journalistic formats like audiovisual features, short documentaries, interactive documentaries, situated documentaries, "WebDocs" and "Newsgames" (Domínguez-Martín, 2015, p. 416). However, they also possess a series of unmistakable characteristics that make them a new and independent format. We highlight three among them: the representation of a realistic, spherical setting based on the use of 360° video, the possibility the user has to choose the

Boy, from Nintendo (1995) or the viewer designed for the Sony PUD-J5A PlayStation 2 console (2002). In the case of Virtual Boy, the screen had a monochrome resolution of 384 x 224 pixels (per eye), while in the Sony computer (iXBT Labs, 2002) it was approximately 450 x 240 pixels (per eye). That is, a resolution similar to that of the first mobile phones, in both cases. Currently they offer a resolution of 2160 x 1200 pixels.

⁹ "Walking New York" (April 2015) was the first 360° video publication of The New York Times in collaboration with Within (formerly Vrse). Available at www.youtube.com/watch?v=fo-89v4Fk-M.

¹⁰ Available at <https://www.youtube.com/watch?v=ecavbpCuvkl>.

angle of vision and, lastly, the existence of a certain degree of participation on the part of the spectator.

2.3. Immersive feature in 360° video

We include within this context the study of immersive feature in 360° video, which we define as a:

Model of a representation of reality which narrates and describes actions and events of human interest on the basis of real images recorded in 360° video. It makes use of immersive technologies to create in the spectator the illusion of being present at the event with a first-person perspective from which they can better understand the circumstances, identify with the character and even experience the emotions that accompany the reality being represented (Benítez & Herrera, 2017a, p. 198).

In order to better focus our subject matter, we complete this definition with a brief characterization of this new mode. To do so, we start with a theoretical review in which we have taken into account the contributions related to:

- 1) the study of literary, journalistic and audiovisual narratives (Genette, 1989; Gaudreault & Jost, 1995; Chillón, 1999; Casetti & Di-Chio, 2007; Carmona, 2010);
- 2) the study of immersive narratives (Lunenfeld, 1993; Ryan, 2004, 2005; Dinmore, 2008; Weil & De la Peña, 2008; De la Peña *et al.*, 2010; Domínguez, 2013a, 2013b, 2017; Gifreu, 2013; Dolan & Parets, 2015; Jiménez, Paíno & Rodríguez Fidalgo, 2016; Domínguez, 2017; Hardee & McMahan, 2017); and
- 3) the study of psychological elements at work in virtual environments (Heeter, 1992; Ijsselsteijn *et al.*, 2001; Cohen, 2001; Ijsselsteijn *et al.*, 2002; Sánchez-Vives & Slater, 2005; Igartua, 2007; Muñiz & Igartua, 2008; Slater, 2009; Slater *et al.*, 2009, 2010; Tal-Or & Cohen, 2010; Kastanis & Slater, 2012; Igartua & Fiuza, 2018), among others.

To this review we also add the viewing of more than 1,000 features of this type published in the last three years by prestigious national and international media.

On the basis of these contributions, we consider immersive features in 360° video to be characterized by:

1) Representing a realistic setting. This means that, in its recording, all devices that reveal the mediation must disappear. Among them, we highlight:

- a. The treatment by the journalist and the technical film crew. When they are not removed from the scene, the spectator sees them in the place where she is, which ruptures the sensation of reality.
- b. Some production techniques also reveal the mediation when the layout or scene is changed because they create an easily noticeable effect that does not occur in a real setting. In this regard, a recent study concluded that transition by simple cut “was the most appropriate for maximum coherence because it was the most invisible and had a more limited impact on the sense of presence.” Conversely, the use of vortex transition revealed the mediation (Men *et al.*, 2017, p. 286).
- c. Superimposition in the form of labels, graphic elements, windows, subtitles, etc., because they add a component of artifice which reduces the credibility of the setting (Lombard & Ditton, 1997).

2) Offering the user the possibility to choose what they see and the frame of the scene. In immersive features in 360° video, the use of first-person perspective favors the existence of a subjective point of view that the spectator makes their own (Slater *et al.*, 2010, p. 4). This is achieved through the use of two resources:

- a. A primary focus, through which the spectator “shares” the identity of the character, thus reaching a higher degree of proximity. The secondary focus creates greater distance because the spectator approaches the character, but from his own perspective. Zero focus offers an external vision of the character, maximizing the

- distance (Ryan, 2004, p. 166; Gaudreault & Jost, 2010, p. 141; Domínguez, 2013b, p. 183).
- b. The height of the camera. In immersive features, the spectator's view assumes the position of another character, which can be himself or an actor from the event (De la Peña *et al.*, 2010, p. 291). To achieve this identification, the camera lens must coincide with the height of the spectator's eyes. The more they are separated, the greater the loss of realism becomes. In this regard, a bird's eye, isometric or lateral perspective accentuates the distance (Domínguez, 2013b, p. 185).
- 3) Creating different types of interaction. Interaction is understood as the subjective experience of presence (Heeter, 1992, p. 262). Following this author, in immersive feature in 360° video, we find three ways of interaction:
- a. Social: refers to the possibility that the characters "interact" with the spectator within the story through looks, gestures or voices.
 - b. Environmental: related to the degree to which the setting seems to recognize that the spectator is there and reacts to them. Although the response is purely apparent in 360° video immersive features, some actions like going for a ride or walking can be simulated.
 - c. Personal: through which the spectator feels they are in the event on seeing some part of their body. Domínguez refers to the personification of the spectator and underscores the importance of this factor, not so much to feel empathy for the embodied character, but so that they identify with the reality that is being transmitted (Domínguez, 2013b, p. 298).
- 4) Appealing to the participation of the spectator. On the basis of the different ways that Ryan (2005) and Dolan and Parets (2015) propose with regard to user interaction in virtual narratives, we believe that, in immersive feature in 360° video, the spectator can "participate" in four ways according to their proximity to the characters and the story:
- a. Passive observer: the spectator is outside the narration and all of their actions are merely exploratory.
 - b. Active observer: the spectator is outside the narration, but their actions direct the order in which the content is shown.
 - c. Passive participant: the spectator is inside the narration when they take on, for example, the role of a character. Their actions progress throughout the course of a structured story with some freedom of exploration.
 - d. Active participant: the spectator is completely inside the narration and the story is created in real time, partly by the user and partly by the system.

3. Method

3.1. Goal and research question

The goal of this article is to analyze what the level of immersion is in immersive feature in 360° video published by Spanish news media. To do this, and given the exploratory nature of this study, we decided to start with a research question instead of putting forward a hypothesis, as we cannot now venture what relation there is between the different variables. Specifically, the question that we pose is the following:

What is the level of immersion in immersive feature in 360° video published by Spanish news media?

3.2. Design of an instrument of analysis

As we put forward in the introduction, in trying to measure presence in virtual environments, there is no agreed method because of the convergence of several subjective elements that make such measurement difficult. It is generally evaluated through questionnaires given to participants during or after an experience (Diemer *et al.*, 2015, p. 5).

However, and despite this starting limitation, we also know that using or not using a series of narrative resources directly related to the content can contribute to creating a greater sense of presence, as some of the aforementioned studies have demonstrated¹¹.

To transfer this idea to a scale of measurement, we created a first plan in which we grouped the narrative resources around 11 variables and provided them with a series of categories to compile the different realities that we can find in 360° immersive feature. Once this first guide was designed, we regrouped the different categories on a three-point ordinal scale, where:

- i) 1 indicated a “non-immersive” level
- ii) 2 indicated a “semi-immersive” level and
- iii) 3 indicated an “immersive” level

Given that it is an experimental design, we decided to call upon 10 experts¹² to evaluate this proposal on its form and content and assign a score to the greater or lesser immersion that each of the categories generates. To this end, we sent a questionnaire with the idea that they could score the narrative resources presented and the level of immersion that, in their judgment, each of the resources offers.

Before beginning the treatment of the data, we checked the reliability of the scale with Cronbach’s coefficient alfa test. This test allows us to measure the internal consistency among the variables. We obtained a very high coefficient alfa of $\alpha=0,14$, which, following the considerations of Nunnally (1978, p. 226), allowed us to validate this scale.

Once the evaluations from the experts were obtained, we took the mode as the statistical value, that is, the value that was most repeated in their scores, because we considered it reflects to a larger degree the coincidence in the evaluation of each judge. The final scale was designed in the following manner:

¹¹ On this, Benítez de Gracia and Herrera Damas (2018b) conduct a comparative analysis between two features using different techniques with different impacts in terms of immersion.

¹² The election of these experts was carried out according to their high degree of connection with this type of narrative either from their professional field (journalists, producers) or from the academic perspective (as professors and researchers). The final list of participants was constituted by a group of ten highly qualified people to assess our scale. Among practioners, we counted with the collaboration of Ignacio Ferrando (Director of the Abaco Digital production company), Xavier Conesa (Director of the Visyon 360° production company), Adriano Morán (Director of 93 Metros production company), David García (journalist and content 360° producer in 93 Metros), Miriam Hernanz (responsible for the RTVE Lab in RTVE), Daniel Rojas (photographer and content 360° producer in 3govideo) and Jon Sedano (journalist and responsible for 360° content in Diario Sur). The experts with a more academic profile were Laura Raya (Ph. D. in Computer Engineering and Master's Degree in Animation, Simulation and Virtual Reality and Director of the Master's Degree in Graphic Computing and Simulation in U-tad), Sara Pérez-Seijo (Researcher of Grupo Novos Media and Ph. D. student in Contemporary Communication and Information at the University of Santiago de Compostela, where she conducts her doctoral thesis in immersive narratives) and Eduardo Herranz (Adjunct Professor in the Computer Science Department at the Carlos III University of Madrid, where he’s conducting his doctoral thesis in the Science and Information Technology Ph.D. program).

Table 3: Variables used to measure the degree of immersion in 360° video feature.

	Spatial representation				Point of view		Spectator interaction and participation				
	Treatment of space (X ₁)	Continuity (X ₂)	Sound effects (X ₃)	Superimpositions (X ₄₁)	Focus (X ₅)	Camera height (X ₆)	Social interaction (X ₇)	Environmental interaction (X ₈)	Personal interaction (X ₉)	Resources for directing attention (X ₁₀)	Spectator role (X ₁₁)
Non-immersive	-The journalist and the film crew appear -The journalist (crew) appears and the film crew is removed (partial) -The journalist (crew) disappears and the film crew is shown -They are substituted by a logo or a graphic at the bottom	-Digital effects	-Not defined	- Windows - Box text -Credits and titles - Subtitles -Image edges -Several elements are combined	- Zero	- Bird's eye view -High-level view -Low-level view	-Not defined	-Not defined	-Several combined	-Not used -Fixed graphic elements	-Not defined
Semi-immersive	-The journalist (crew) appears and the film crew is removed (total) -The journalist (crew) disappears and the film crew is removed (partial)	- Cut - Fade out/in - Several combined	Soundtrack Narrator's voice	-Navigation buttons	-Secondary -Combines primary and secondary -Primary and zero -Secondary and zero -All three combined	-Elevation with regard to the height of the eyes from 30 to 100 cm -Combines several different views of the height of the spectator's eyes	- Look	-The spectator is still or sitting	-Spectator not represented -Spectator completely represented	-Guided voice of a narrator - Blurring	-Passive observer
Immersive	-The journalist and the film crew disappear	-Single shot -Chained sequences	-Voices of witnesses -Special effects - Combined or more resources - Ambient sound	-Not used	-Primary i	-Eye level	- Gestures - Voice -Combined or more actions	-The spectator "gets on" a means of transport -"Moves around" with their legs -Combined or more actions	-Partially shown to the spectator	-Lights or flashes -Moving objects -Color -Sounds -Guided voice of a character -Combined or more resources	Passive participant Active observer

Source: Own elaboration.

3.3. Sample

Once the goal and the research question were defined, we proceeded to select the sample for the study. To do this, we took each of the 360° video features published by Spanish news media as one unit of analysis. The period under consideration covers three years, from January 2015, the year these features began to be published on a regular basis, to December 2017.

To select the media, we used the "2017 Communication Agenda," choosing those that appear in the category of print media, digital newspapers, radio and/or digital TV for general information, which publish in Spanish and have a video channel on YouTube and/or Facebook. On the basis of this list, we accessed the respective channels of these media on YouTube, Facebook, Twitter and their own web sites and used a series of search terms to verify whether they had published some content that could be considered for the analysis. The *corpus* consisted of a total of 148 pieces published by 18 Spanish mass media organizations.

Afterwards, we encoded the sample in Excel on the basis of a system of ordinal quantification and then exported the data to SPSS software (24.0 version) for their treatment.

4. Results

4.1. Average level of immersion in the features analyzed

To calculate the general level of immersion of all the features analyzed, we chose the average of the results that we obtained for each of the variables analyzed. The results reflect a greater percentage of “semi-immersive” features, which account for 78.4% of the entire sample. The “non-immersive” features represent 15.5%, while those considered “immersive” account for 6.1% of the total. In the following table, we offer the distribution in frequencies and percentages:

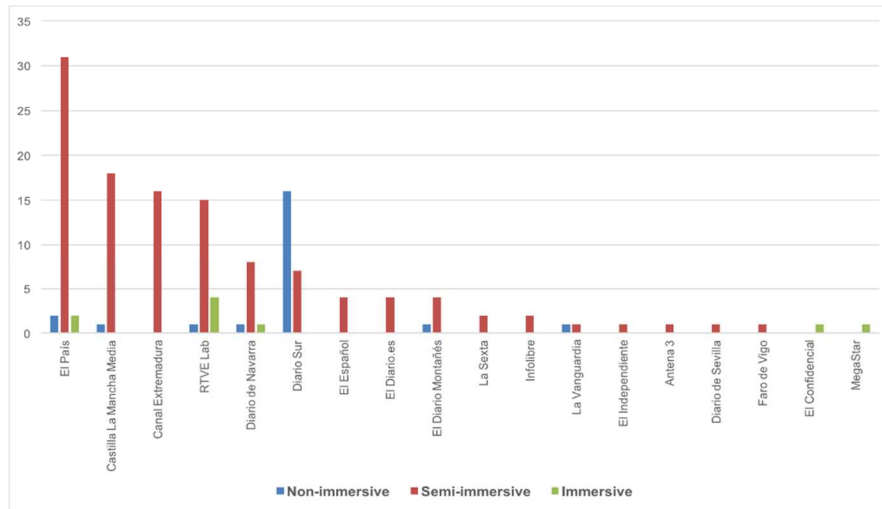
Table 4: Level of immersion of 360° video features produced by Spanish news media.

		Non immersive		Semi immersive		Immersive	
		Frequency	%	Frequency	%	Frequency	%
Treatment of space	X ₁	55	37.2%	40	27%	53	35.8%
Continuity	X ₂	1	0.7%	41	27.7%	106	71.6%
Sound effects	X ₃	77	52%	2	1.4%	69	46.6%
Superimpositions	X ₄	21	14.6%	-	-	123	85.4%
Focus	X ₅	38	25.7%	92	62.2%	18	12.2%
Camera height	X ₆	61	41.5%	34	23%	52	35.4%
Social interaction	X ₇	147	99.3%	0	0	1	0.7%
Environmental interaction	X ₈	-	-	133	89.9%	15	10.1%
Personal interaction	X ₉	1	0.7%	145	98%	2	1.4%
Resources for directing attention	X ₁₀	112	75.7%	2	1.3%	34	23%
Spectator role	X ₁₁	101	67.8%	41	28.1%	6	4.1%

Source: Own elaboration.

The analysis by media reflect this distribution. The media that publish a higher number of semi-immersive features are *El País* (in 20.9% of the whole sample), Castilla La Mancha Media (12.2%), Canal Extremadura (10.8%), RTVE Lab (10.1%) and *Diario Sur* (in 4.7%). Notable among those that publish very immersive works are RTVE Lab (2.7%) and *El País* (1.4%), although theirs are very small percentages of the total sample. The news medium that publishes a greater percentage of what we qualify as “non-immersive” features is *Diario Sur*. The distribution by media is reflected in the following histogram:

Graph 1: Distribution by media according to their level of immersion.



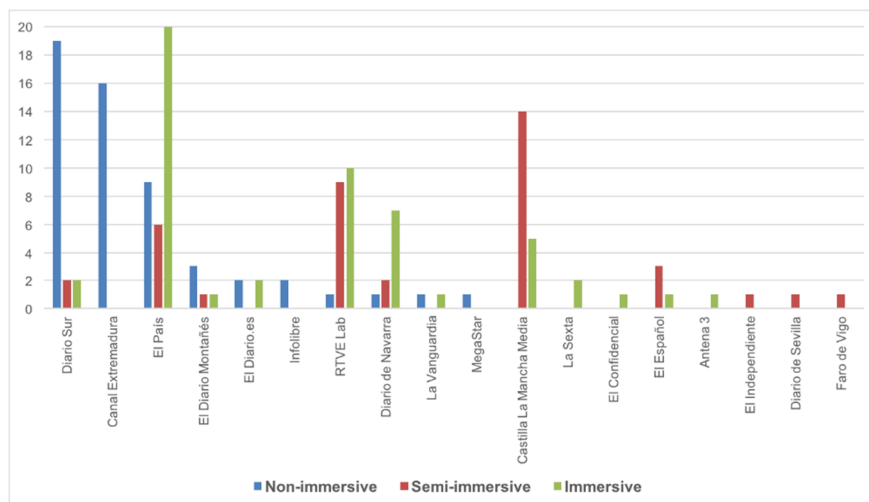
Source: Own elaboration.

4.2. Treatment by the journalist and film crew and use of superimpositions are accurate in terms of immersion

In 35.1% of the cases, both the journalist and the film crew disappear so that the spectator does not see them in the shot. In 41.2%, the level is non-immersive, which increases the possibility of experience a break in presence.

By media, *El País* stands out in the use of this technique (13.5%), followed by RTVE Lab (6.8%), *Diario de Navarra* (4.7%) and Castilla La Mancha Media (3.4%). We find a greater percentage of features that do not make the journalist or film crew disappear in *Diario Sur* (12.8%), Canal Extremadura (10.8%) and *El País* (6.1%).

Graph 2: Level of immersion with regard to treatment by the journalist and film crew.



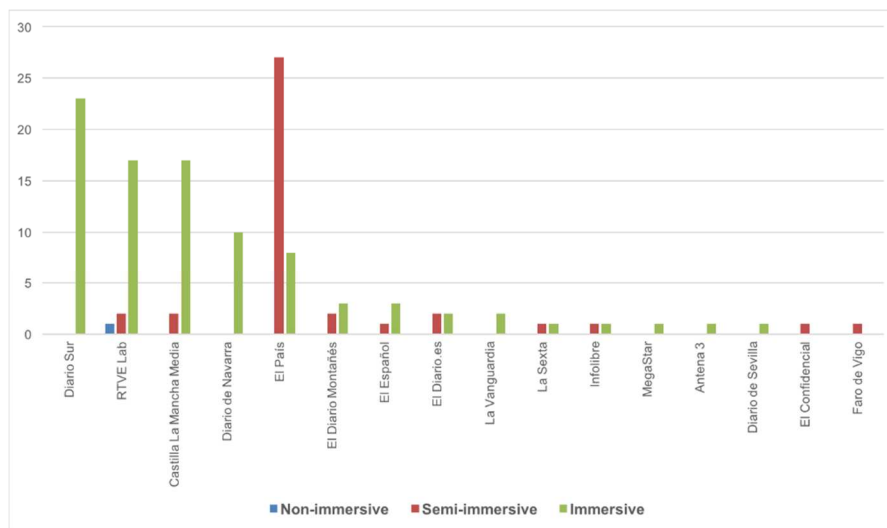
Source: Own elaboration.

As for the technique that is used to establish continuity between scenes, we see that, in 71.6% of the cases, an immersive code is used. In 27.7%, a semi-immersive code is used, and in 0.7%, the code is non-immersive.

From a more specific perspective, 60.1% of the features use a single shot, a very appropriate practice for creating a greater sense of presence. In 3.4% of the total sample, we find chained sequences.

Twenty-seven point eight percent (27.8%) of features use semi-immersive continuity techniques that are distributed in cuts (20.3%) and fades (7.5%). Zero point seven percent (0.7%) establish continuity via vortex transition, a clearly non-immersive technique.

Graph 3: Distribution of media by use of different techniques to establish continuity.



Source: Own elaboration.

In the analysis of sound resources, the results are distributed in two extremes: 52% of the features do not use immersive sound techniques, while 46.6% do. Among the latter, ambient sound (18.9%), ambient sound combined with witnesses' voices (12.8%), soundtracks and ambient sound (3.4%), and a combination of more than two resources are used above all (4.7%). By media, *El País* uses these resources in an immersive way most often (20.3%), followed by *Diario Sur* (15.5%). Conversely, Castilla La Mancha Media (12.8%), Canal Extremadura (10.8%), RTVE Lab (8.10%), and *Diario de Navarra* (6.8%) use sound in a much less immersive code.

The use of superimpositions is residual and we find it in only 16.9% of the cases in the sample. When they are used, box text (6.1%), credits and titles (4.1%), static graphical elements (2.7%) or two or more of these resources combined (4.1%) are used.

4.3. The treatment of the spectator's point of view presents intermediate levels of immersion

As for how the spectator's point of view is treated, we find a certain balance in the three levels of immersion, although non-immersive modes predominate in 41.5% of the sample. In 35.4%, the camera is at the same height as the spectator's eyes, so the treatment would be immersive, while in the remaining 23.1% of the cases, it would be semi-immersive.

The non-immersive use of this technique corresponds to features that present aerial (13.5% of the whole sample), low-level (12.8%) or bird's eye views (9.5%). Also of note are features in which the height of the camera is raised to a spot between one half meter to one meter relative to the eyes of the spectator (18.2%), which would correspond to a medium level of immersion.

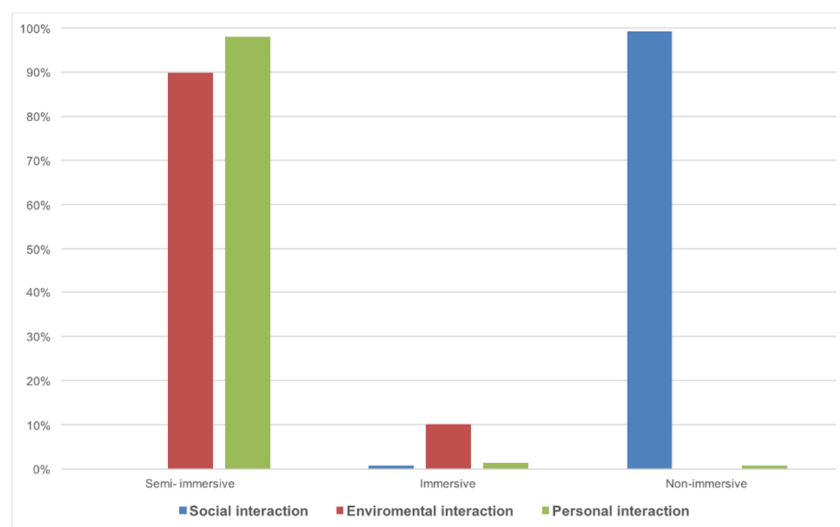
With regard to focus, semi-immersive features predominate (62%), above all because of a greater use of second-person internal focus (54.1%). In 25.7% of the total, we find zero focus,

which would correspond to the lowest level of immersion. By contrast, 12.2% present a very immersive focus which makes use of the first person by using a subjective camera.

4.4. The treatment of the spectator's interaction offers low levels of immersion

Lastly, with regard to social interaction, this is non-immersive in 99.3% of the cases analyzed. Said another way, we find hardly any practices in this regard. As for environmental interaction, that is, the response that the setting might offer to the presence of the spectator, we find some semi-immersive element in 89.9% of the cases and immersive elements in 10.1%. Personal interaction, fostered by the physical representation of the spectator within the action, also occurs in a semi-immersive mode in 98% of the analyzed features:

Graph 4: Level of immersion according to the different types of interaction with the spectator.



Source: Own elaboration.

The spectator appears as a passive observer in 67.8% of analyzed features, which reflects low levels of immersion. In 28.1% of the cases, the spectator is represented as an active observer, which corresponds to a medium level of immersion. In the remaining 4.1%, the spectator appears as a passive participant, which reflects higher levels of immersion.

5. Conclusions

Immersive journalism via 360° video is a new storytelling formula which offers the spectator a unique and until now impossible way to experience an event in a very real way, almost as if they were there.

Our study begins in 2015, when the first studies about 360° video began to be published. These publications were the result of the evolution and drop in price of devices for its creation and viewing and support from big Internet companies and corporations like Facebook and Google.

Being an innovative element, it is not wonder that some news media adopt it and incorporate it into their routines in a context in which innovation has become a key value to guarantee the survival of the media (García-Avilés *et al.*, 2018, p. 370) and in which the consumption of information is mainly done through mobile devices (Salaverría, 2015, p. 149).

Given its novelty and the speed with which it continues to evolve, there are no references or conventions when producing immersive video features in 360°. The guides or manuals – published by several American media and production companies– do not exceed five. This

forces both journalists and producers to experiment and improvise, something that translates into very different practices that, as we have had occasion to verify, are not always proper in terms of immersion.

Only continuity between scenes and the use of superimpositions have adequate levels of immersion in 71.6% and 85.4%, respectively. However, this could also be explained due to the greater ease and lower cost of production when no additional elements are introduced. In any case, the use of smooth transitions between shots and / or sequences would be strongly recommended. Similarly, we advise against the use of other elements whose presence is more perceptible as with the vortex transition. Its artificiality is reflected in Figure 2:

Figure 2: Vortex transitions between scenes in two features “Urban beekeeping” (left) and “Vive Río: Heroínas” (right).



Source: Youtube.

The analysis guide that we present serves as a first reference to assess how news media are using the different storytelling resources related to immersion. It also constitutes a wake-up call to avoid the use of some of them and stimulate the use of others. We would also like to insist on the need to encourage those techniques that, despite the implicit limitation of 360° video, may favor a greater interaction of the viewer within the story. This would make it possible to avoid some of the pitfalls generated by the inappropriate use of resources.

In this sense, the research and dissemination of good practices (Benítez & Herrera, 2017b), both from monographs, guides, talks or seminars seems to be the next –critical, vital and necessary– step to encourage the development of this format in a way that guarantees its adoption and continuity by news media.

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