Immersive journalism: a narrative analysis in virtual reality apps

Periodismo inmersivo. Análisis de la narrativa en aplicaciones de realidad virtual

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ABSTRACT
This paper, which is part of the field of immersive journalism studies, compares the narrative of contents published in El País VR, Folha 360º, Estadão RV and NYT VR, specific applications for 360-degree productions of the newspapers *El País* (Spain), *Folha de S. Paulo* and *Estado de S. Paulo* (Brazil) and New York Times (United States). In addition to identify the main characteristics of 51 publications, the main of this study is to verify the level of immersion these contents provide to the users. Due to this, a content analysis has been carried out, based on methodological contributions by authors from different countries. The final result points out that the spatial immersion level is much higher than the sensory level in most of the sample, which leads to a relative virtual reality experience for the user. Hence, with the exception of the content of NYT VR, the user does not usually feel involved psychologically about to immerse totally in the story and forget reality. Therefore, it is necessary to encourage the creation of more innovative initiatives with digital avatar narratives.

KEYWORDS: immersive journalism; mobile journalism; virtual reality; 360º videos; smartphone.

RESUMEN
Esta investigación, que se enmarca en el campo de los estudios sobre periodismo inmersivo, compara la narrativa de los contenidos de El País VR, Folha 360º, Estadão RV y NYT VR, aplicaciones de realidad virtual de los diarios El País (España), Folha de S. Paulo y Estado de S. Paulo (Brasil) y New York Times (Estados Unidos). Además de identificar las principales características de 51 publicaciones, el objetivo de este estudio es verificar el nivel de inmersión que estos contenidos ofrecen al usuario. Se desarrolla un análisis de contenido basado en contribuciones metodológicas de autores de diferentes países. El resultado indica que el nivel de inmersión espacial es bastante superior al sensorial en la mayoría de la muestra, lo que conlleva a una experiencia de realidad virtual relativa para el usuario. A excepción de los contenidos de NYT VR, el usuario no se siente involucrado psicológicamente a punto de inmergir totalmente en la historia y olvidarse de la realidad. Por tanto, hace falta apostar por iniciativas más innovadoras, que contemplen narrativas con avatar digital.

CONTENTS
1. Introduction and status of the issue. 1.1. Journalism, convergence and mobility. 1.2. Immersion in newspaper products. 2. Material and method. 3. Analysis and results. 3.1. Elements of applications. 3.2. Narrative content and resources. 3.3. Immersion level. 4. Discussion and conclusions. 5. References.

Translation by **Paula González** (Universidad Católica Andrés Bello,Venezuela).

1. **Introduction and status of the issue**

The commitment of the media to developing their own applications began to form part of the design of business models, especially since 2011. This is because the use of apps for mobile devices has increased each year. In Spain, for example, in 2012 the growth was 22% and in 2015, 50% (Fundación Telefónica, 2015). This trend is accompanied by the increase in the sale of smartphones, with a forecast of growth of 2.5% worldwide (Martín, 2017).

The evolution of the technical specifications of smartphones in conjunction with the increase in the quality of mobile data has led to the creation of new types of applications, which combine augmented reality and virtual reality. These apps have evolved to improve the quality of images and reduce annoying effects for users. In 2016, the market was reached by applications that "mix information from the real world with information from the physical world […] Recently, the distinction between augmented reality and virtual reality has been clearly maintained" (Fundación Telefónica, 2016, p. 41). An example of this mix of realities is the Pokémon GO app.

The approach of this comparative study between the applications *El País VR*, *Folha 360º*, *Estadão RV*, and *NYT VR* is based on the fact that the journalistic contents in 360 degrees are relatively new and are constantly evolving regarding the format. Furthermore, there is little comparative research on the virtual reality journalistic contents produced by the reference newspapers in different countries. Hence, the relevance of this research that seeks to identify the characteristics of this type of immersive journalism product is justified (Domínguez-Martín, 2015) and the level of immersion they offer the user, framing the differences and similarities between what is published in all four apps.

1.1. Journalism, convergence, and mobility

With the evolution of technology and wireless connection networks, convergence, innovation, and mobility make up the basis of online journalistic production, increasingly marked by ubiquity (Colussi, Gomes-Franco e Silva & Rocha, 2018). Undergoing different types of convergence, starting with the technologic one, journalism has undergone significant adaptations in its modus operandi (Salaverría & García Áviles, 2008). The journalistic companies, that before the development of the commercial web stood out for a media or reference area, start to act in various areas of communication. The construction of the narrative is altered by the different languages that are combined in the convergence (Jenkins, 2006). The long-form format (Longhi, 2014) is an example of this type of content, in which various multimedia resources- audio, video, interactive infographics, etc. -are explored to build a multimedia report (Colussi & Magalhães, 2016). Likewise, the production structures of these companies are also affected by the convergence process. The newsrooms of the newspapers, radio, television, and internet, which previously operated separately,

give way to the integrated newsrooms (Salaverría & Negredo, 2008), where new business models are proposed, which include, for example, digital subscriptions with native products for mobile devices (Colussi, 2016), typical of ubiquitous journalism (Colussi, Franco-Gomes & Rocha, 2018).

Autochthonous products for smartphones and tablets gain prominence in the mainstream media, especially since 2011 when surveys confirm the constant rise in the consumption of information from mobile devices among the youngest (Reuters Institute, 2018). Before this period, the content available in the mobile applications of the mainstream media in the United States, China, Brazil, and several European countries corresponded to transpositions of the traditional media offers, a model similar to what happened in the early years. of journalism on the web (Canavilhas & Santana, 2011). Besides, it was identified, at this time, that apps barely explored the technical characteristics of mobile devices.

It should be noted that pioneering journalistic products for smartphones and tablets emerged during the fourth generation of journalism in digital networks (Barbosa, 2013). In the first phase of mobile journalism, the Brazilian newspaper *Extra* launched in 2009 the *Repórter 3G* project for content production. Journalists received a kit to generate content and send it through a smartphone (Firmino da Silva, 2015). In the current phase, mobile devices reconfigure the processes of production, editing, and circulation of content (Silveira & Saad, 2018). Autochthonous products adapted to the specificities of mobile devices also emerge as promoters of an innovative scenario (Colussi, 2017).

Regarding innovation in the journalistic field, the creation of technological innovation laboratories (media labs) in the American and European reference media stands out. Among the main objectives of this type of space in newsrooms are: 1) developing applications for news content and 2) creating new formats and narratives for journalistic products (Salaverría, 2015). From these initiatives, the media are betting on the creation of transmedia content, such as the Spanish Radio and Television Audiovisual Innovation Laboratory (RTVE).

1.2. Immersion in journalistic products

Contemporary journalism seeks various ways of bringing the audience closer to news events, such as textual or technological resources that favor experiences of the presentification of events. Also taking into account that virtual reality allows a higher level of interactivity, the media is betting on the use of virtual reality (VR) to provide users with "an immersive experience that replicates a real or imagined environment" (Aronson-Rath, Owen, Milward & Pitt, 2015, p. 12).

In this case, virtual reality is expressed through 360-degree productions generated with the help of a computer and displayed on specific players for this format or on websites that support it, such as YouTube or Facebook (Costa & Brasil, 2017). This technology allows the use of virtual reality glasses, which project images on small screens close to the user's eyes.

Applied to the elaboration of informative content, virtual reality emerges as new expertise in journalistic work: immersive journalism. It consists of "*the production of news in a form in which people can gain first-person experiences of the events or situation described in news stories*" (De La Peña *et al.,* 2010, p. 291). Domínguez-Martín (2013, p. 94) corroborates with this perspective, stating that "immersive journalism expresses itself in all its potential with virtual and immersive reality technologies and equipment, which allow not only visual but also sensorial experimentation of a three-dimensional synthetic environment".

For the development of immersive journalism, the use of technologies that manage to sensory eliminate the physical border between the individual and the media is recommended (Domínguez-Martín, 2013). This in immersive practice supposes immediacy, that is, the illusory relationship that there is no mediation in communication operations.

The fundamental idea of immersive journalism is that it allows the user to have contact with the environment of the event through its representation in the form of a digital avatar -an animated 3D character who sees the world from the first-person perspective. In this way, the user can move in the immersive system, since the movements of the arms and legs of the virtual body would accompany the real one.

> The participant can also enter the story in one of several forms: as oneself, a visitor gaining first-hand access to a virtual version of the location where the story is occurring, or through the perspective of a character depicted in the news story. Whether visiting the space as oneself or as a subject in the narrative, the participant is afforded unprecedented access to the sights and sounds, and possibly, the feelings and emotions that accompany the new. (De La Peña *et al.,* 2010, p. 292)

De La Peña (2010) still reveals that one of the notable aspects of immersion in virtual environments refers to the tendency of people to respond in a real way to virtual situations, although it is known that they are not. This type of behavior is called RAIR (Response-As-If-Real), which corresponds to a "response as if it were real". This occurs even when the level of fidelity in relation to everyday physical reality is quite low.

In this sense, at least three cognitive properties contribute to creating journalism immersion experiences from the sense of presence in the environment represented by virtual screens: 1) Place of illusion -which awakens the feeling of being or operating in a remote or virtual place-; 2) Plausibility -the illusion that what is happening is actually happening-; and 3) Body property -neuroscientific concept to designate the plasticity of the brain to create body representations- (De La Peña *et al.,* 2010).

It should be noted that the virtual reality systems associated with journalism are the only ones capable of offering first-person experiences in the news, with a different level of understanding than that offered by reading a printed or audiovisual report (De La Peña *et al.,* 2010). Thus, in addition to informing, immersive journalism allows the user to experience what happened.

In this line, Domínguez-Martín (2010) argues that the immersion in journalism

> It can be roughly defined as story presentation that allows the Internet user to interact with story elements or data. Instead of "reading" a story online, the user gets to "do" something – and in the process learn, and better understand the topic. (Domínguez-Martín, 2010, p. 3)

From these reflections, we understand immersive journalism as one of the horizons for the future of journalistic production, since it presents elements of innovation for newsrooms while offering ways

to expand the potential of participation and/or interaction of the individual with elements of the stories.

2. Material and method

This comparative study aims to identify the characteristics of the 360-degree content published in mobile applications and the level of immersion they offer the user, pointing out the differences and similarities between what is published in each app.

In order to carry out this work, firstly, a field research was carried out in June 2017 to select the sample of reference newspaper apps in Ibero-America specific for the publication of 360-degree content. For this, 15 reference headings were taken into account in 9 Ibero-American countries: *La Nación* and *Clarín* (Argentina), *El Mercurio* and *La Tercera* (Chile), *El Comercio* (Peru), *El Tiempo* (Colombia), *Reforma* (Mexico), *Prensa Libre* (Guatemala), *O Estado de S. Paulo*, *Folha de S. Paulo*, and *O Globo* (Brazil), *El País* and *El Mundo* (Spain), *Público* and *Diário de Notícias* (Portugal).

At the time of the field research in the Google Play and Apple Store stores, it was identified that only three media had a 360-degree content app. The applications found were: *El País VR* (Spain), *Folha 360º*, and *Estadão RV* (Brazil). Taking into account that NYT VR was the forerunner app, we decided to include it in this study to have more comparison elements between the Ibero-American media applications.

Next, a preliminary observation of the selected apps was carried out to delimit the fundamental elements to take into account for the analysis of web content (Herring, 2010). Web content analysis was chosen because it contemplates other variables that traditional content analysis (Bardin, 1977) does not include, such as comment spaces, insertion of links in the content, or the use of interactive pieces. For the content analysis, in the case of *El País VR*, *Folha 360º*, and *Estadão RV*, 3, 23, and 15 videos respectively have been analyzed, which corresponds to all the content available in these apps until February 25th, 2018. Specifically, in NYT RV, the last ten publications were taken into account, totaling 51 videos analyzed. It is worth noting that the data collection was carried out with the use of Cardboard-type virtual reality glasses.

In this sense, taking into account the main objective of this research, the following analysis variables are proposed[1]:
1. Elements of the application: identify the menus, language options, type of access to the content (free or by subscription), and consumption of the content (through download or directly).
2. Publication frequency: count the number of content available in each app to obtain an average of the publication frequency of the analyzed media.
3. Topic: find out the issues covered in this type of content.
4. Duration: record the duration time of each publication.
5. Narrative resources: identify the use of the elements that make up the 360-degrees narrative – audio narration, photographs, songs, textual information, icons, etc.
6. Editing: check the quality of the images and other elements included in the panoramic content.
7. Immersion level: find out the types and levels of immersion of each story. Based on the proposal for the categorization of journalistic immersion of Costa and Brasil (2017), we have

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[1] Students Angie Rangel and Leidy Herrera participated in the collection of data from this research, as part of activities developed by the research seedbed "Studies on mobile journalism in Colombia", from the Universidad del Rosario.

taken into account the following variables and categories: a) spatial immersion, which includes the levels of presence, simulation, and reasonableness; and b) sensory immersion, referring to commitment, adaptation, and absorption immersion (chart 1).

Type of immersion	Spatial	Sensory
Immersion level	Presence	Commitment
	Simulation	Adaptation
	Reasonableness	Absorption

Chart 1. *Types and levels of immersion in journalistic content*
Source: Costa and Brasil (2017).

To determine the immersion level, an analysis of the virtual reality contents published in the four selected applications was carried out based on the matrix of visual and interactive characteristics of the digital immersion developed by Domínguez-Martín (2015), to classify the types and levels of immersion (Costa & Brasil, 2017).

In this sense, the research was developed based on the following hypotheses:

H1: Considering that most of the reference newspapers do not have specific equipment for journalistic productions in 360 degrees, the publication frequency is low.

H2: The development of immersive narratives is still incipient in the media, which leads to the publication of content that especially promotes spatial-type immersion.

3. Analysis and results

3.1. Applications' elements

The NYT VR application was released in November 2015, so the New York Times was the forerunner in publishing journalistic content in 360 degrees through a native app and for this specific purpose. For being the pioneering application and prioritizing the technical quality of its publications, NYT VR has served as a reference for other media outlets that bet on virtual reality journalistic content. The Brazilian newspapers *Estado de S.Paulo* and *Folha de S.Paulo*, meanwhile, launched their Estadão RV and Folha 360 ° apps in the first quarter of 2017, while the Spanish newspaper started with El País VR in May 2016. It is worth noting that access to the content of the four applications is free and that the publications are also available on the YouTube channel of each media outlet. According to Figure 1, it can be seen that the four studied applications present differentiated design proposals, with NYT VR and El País VR being the ones that explore the image the most to the detriment of textual information.
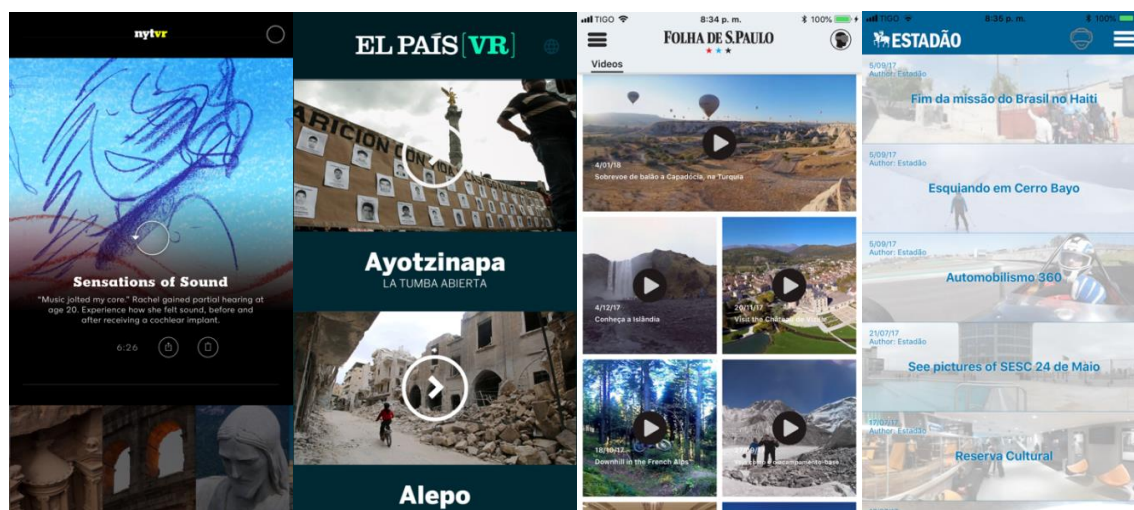
Figure 1: the main screen of the four analyzed apps.
Source: screenshot.

Despite *El País* having launched its 360 application a few months after the emergence of NYT VR, its app is the poorest among those analyzed in this study. It has a menu that allows the user to choose between three languages –Spanish, English, or Portuguese– in addition to having access to the three published reports. Regarding the menus available in the American newspaper app, the presence of a single button in the upper right of the screen, which corresponds to the configuration, stands out. By clicking on this option, a tab opens where the user finds three types of menu: 1) Option to activate notifications to receive an alert when new videos are published; 2) Support, which offers two spaces: one that allows the user to send an email to nytvr@nytimes.com to report bugs and the other that includes frequently asked questions; and 3) About, where the user finds information about the current version of the application and the number of published contents. In addition to this, the application allows content sharing via social networks and WhatsApp. However, to access shared content, the user must download the app.

Estadão RV offers the user a menu similar to that of the American application and Folha 360° has a simpler menu, from where you can access the videos, share them on social networks or download them, in addition to obtaining technical information regarding the app.

3.2. Contents and narrative resources

Regarding the duration of the 51 analyzed videos, the predominance of audiovisual production of less than two minutes, micro-documentary type, a practice adopted by digital media in recent years due to the influence of publications on social networks, such as Facebook and Instagram, is observed. Folha 360° has videos that vary between 38" and 5'52", with "*Interior da barraca de refugiados no Quênia*" being the shortest of all analyzed content, recording an average of 2'49". Estadão RV follows a similar dynamic, with the majority of the videos lasting up to five minutes, except for the video about the cultural teams on Avenida Paulista with 6'41" and an average of 3'06. NYT VR features videos between 56" and 12'15", with "*The National: Something Out of Nothing*" being the longest, averaging 2'52". Unlike other apps, El País VR calls our attention for having videos with a duration between 4'11" and 9'20", with an average of 6'22", which is perhaps due to the type of journalistic product that, in this case, resembles great reports or short documentaries about international issues.

Regarding the publication frequency, the applications of the Brazilian newspapers published little more than one video per month, taking into account that Estadão RV uploaded its most recent content in September 2017. The only three publications available in El País VR are from April, July, and September 2016. Lastly, NYT VR maintained an average of 2.5 videos per month. In this way, the results of this study indicate that the American and Spanish applications have, respectively, the highest and the lowest publication frequency, being that the latter is also the one that has published the least content.

Topics on tourism, sports, and culture have predominated in the 360-degree videos published in the studied apps (table 1). Both NYT VR and Folha 360° explored tourist places in 70% and 39% of the published videos, respectively. Estadão RV stands out for prioritizing sports and cultural content, while El País VR was devoted exclusively to international affairs. More complex topics that refer to international or social problems have less visibility in this type of content. In this case, the results of the analysis reveal that soft news stand out.

Table 1. *Topics of posts in each app.*

Topics	Estadão RV	Folha 360º	El País VR	NYT VR
Sport	7	8	-	-
Culture	7	-	-	1
International	1	4	3	1
Social problems	-	2	-	-
Tourism	-	9	-	7
Health	-	-	-	1
Total	15	23	3	10

Source: own elaboration.

Regarding the narrative elements used in the 360-degree videos published in the four applications, it is observed that, on the one hand, NYT VR stands out for exploring 3D images and animated illustrations and comics in its videos, which leads to an experience of differentiated immersion. We are surprised that El País VR combines the use of the same resources in its three publications -audio, text, music, image, and ambient sound-. This shows that the Spanish newspaper has not explored the combination of different resources in this type of content (table 2).

Table 2. *Narrative resources used in 360º videos.*

Apps/ Narrative resources	Audio (off)	Text	Music	Image	3D Image	Illustration	Comic anim.	Ambient sound
Estadão RV	40%	47%	80%	47%	-	-	-	-
Folha 360º	26%	57%	39%	96%	-	17%	-	43%
El País VR	100%	100%	100%	100%	-	-	-	100%
NYT VR	30%	80%	90%	20%	70%	60%	10%	80%

Source: own elaboration.

Folha 360º and Estadão RV, on the other hand, experienced narrative resources on a very regular basis. In the first case, the narrative is restricted to the use of audio, moving images, music, and text. The association of image and text or image and music is observed in most of the analyzed videos. In some content, such as "*Festa na av. Paulista durante a parada LGBT*" or "*Sobrevoo de balão a Capadócia*" there is only the use of images and ambient sound, without any information to guide the user in the narrative. In the second case, the combination of images and music prevails, so that the

audio narration, the textual information, and the presence of ambient sound appear in the minority of the contents. In this sense, the association of few narrative resources favors a less complex immersion experience.

3.3. Immersion level

Regarding the types and levels of immersion in the narratives, better execution of spatial immersion is perceived in the 360 contents of the four analyzed applications to the detriment of sensory immersion -developed only by NYT VR-. Except for Estadão RV, the other apps comply with the three levels of spatial immersion (table 3). In this case, the videos visually transport the user to another spatial context through the levels of presence, simulation, and reasonableness, which enables the user to have the feeling of being in an external environment (Costa & Brasil, 2017). This experience is possible thanks to the use of virtual reality glasses that provide the user with a realistic feeling of movement through space. Besides, the use of graphic scenes from the physical world associated with continuous movements and the dynamism of the scenes favors the sense of presence in the environment, even in videos without a diversity of narrative resources. This is the case, for example, of "*Visite um castelo francês em 360*" published in Folha 360º which, having images, music, and ambient sound, allows complete visualization of the external garden and the interior of the castle of Chateau de Vizille in France.

Table 3. *Types and immersion level identified in the videos of the apps.*

Type of immersion	Immersion level	Estadão RV	Folha 360º	El País VR	NYT VR
Spatial	Presence	x	x	x	x
	Simulation	-	x	x	x
	Reasonableness	x	x	x	x
Sensory	Commitment	-	-	-	x
	Adaptation	-	-	-	x
	Absorption	-	-	-	-

Source: own elaboration.

Simulation, for its part, enables the psychological border between the observer and the visual space to be removed, since the user identifies and experiences the environment in which it is located (Costa & Brasil, 2017). In the analyzed videos, it is noted that this level occurs, above all, in the contents in which there are internal focusing and ocularization, techniques that favor the narration, and the gaze of the character. In NYT VR's *"New seven wonders in 360: The Colosseum"*, the video begins with a motorcycle ride through the streets of Rome giving the user the feeling of being the driver's companion.
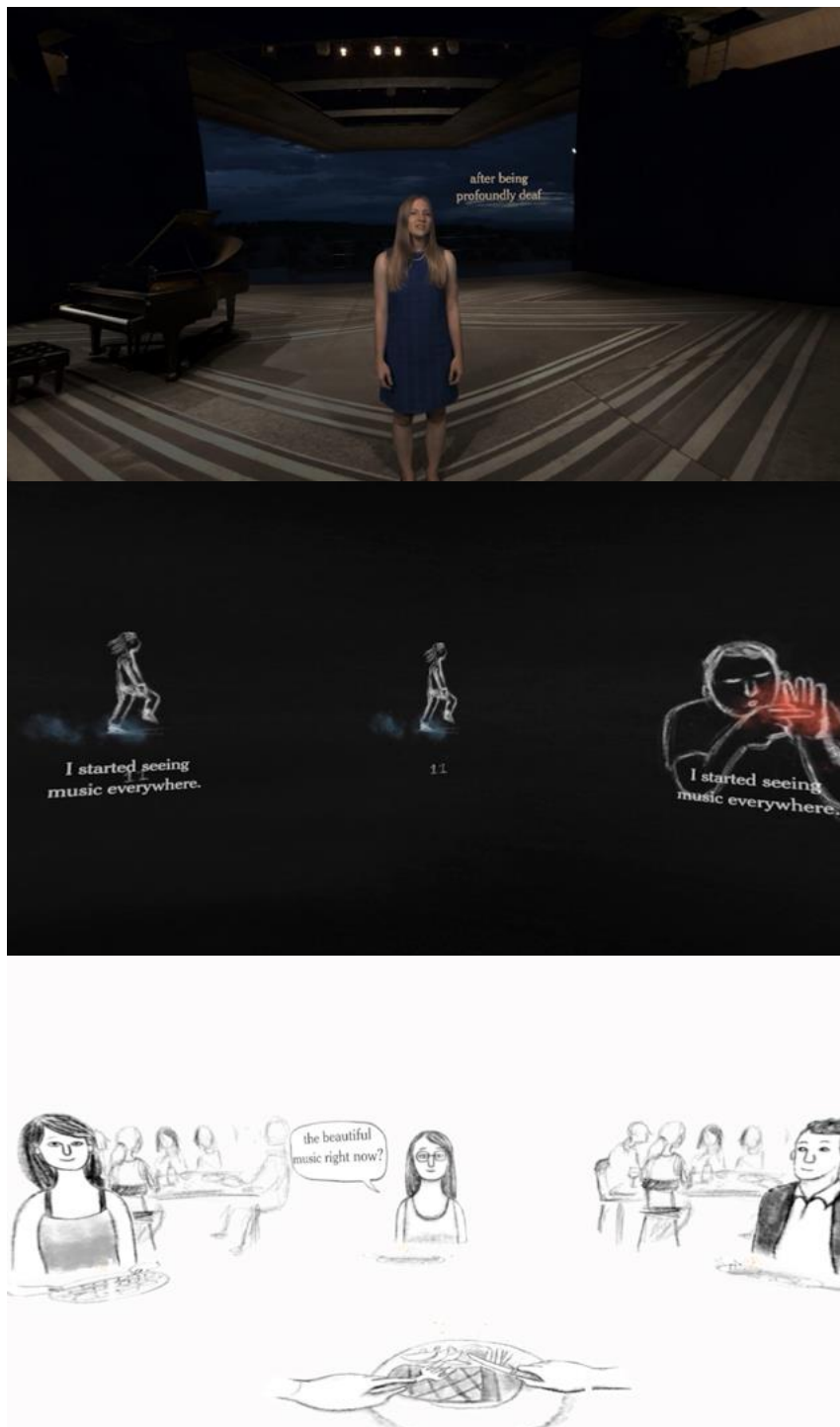
Figure 2: the sequence of the NYT VR Sensations of sound narrative.
Source: NYT VR screenshot.

It should be noted that the presence of the background image of the alter ego (secondary internal ocularization) in 360-degree publications increases the level of spatial simulation because the identity of the character remains hidden during the narrative, giving the user the feeling that he is the author. of the actions presented in that space.

Given reasonableness, the user has the feeling of being in a plausible space that makes sense and corresponds as much as possible to the real world (Costa & Brasil, 2017). An example is the report

"Alepo: patrulla con los cascos blancos sirios", from El País VR, in which the user has the feeling of witnessing the hostile scenes typical of the context from the ambient sound and images.

As for sensory immersion, NYT VR is the only app that offers content at the levels of commitment and adaptation. The commitment exists when the content has elements that allow the user to disconnect from the external world to explore the story, while the adaptation refers to the process of familiarization of the user to the simulated environment (Costa & Brasil, 2017). "Sensations of sound", produced by the American newspaper, covers these two levels of sensory immersion. By combining studio-recorded images with animated comics, music, illustration, audio, and testimonial, the journalistic product allows the user to dive into the story of a girl who started listening after adulthood (figure 2), so that it disconnects from the outside. This example is the closest to a virtual reality experience in journalism.

None of the four applications has presented the third level of sensory immersion since the total absorption of the narrative has not been identified. At this level, "the work captures the user's attention in such a way that it loses the references of the external world; and the critical sense of the quality and truth-value of what is presented disappears" (Costa & Brasil, 2017, p. 157). In this sense, the results of the study suggest that there is no third-level sensory immersion because a total absorption in the analyzed contents has not been observed -it has been found that at some moments the user is distracted during the consumption of the video-. The absence of a digital avatar to represent the user and enhance the feeling of experience without mediation, as well as the lack of menus for scenes and options in the story, contributes so that the absorption of the content of the narratives in 360 degrees was not complete.

4. Discussion and conclusions

After carrying out the analysis of 51 videos published in Estadão RV, Folha 360º, El País VR, and NYT VR, it was found that the level of spatial immersion was higher than sensory immersion in most of the analyzed content (80.4%). When watching the videos with the virtual reality glasses there is the feeling of presence in the space, but the first-person relationship with the narratives is limited. In most cases, the user does not feel psychologically or emotionally involved to the point of totally immersing himself in the story and forgetting reality. Only the New York Times application has used narrative resources to build content that awakens a virtual reality experience that includes levels of sensory immersion. In this sense, the research corroborates hypothesis 2, which presupposed that the development of immersive narratives is still incipient in the media, which leads to the publication of content that especially promotes spatial-type immersion so that the user does not experience a sensory immersion at the absorption level (Costa & Brasil, 2017). In other words, the public doesn't feel psychologically involved to the point of totally immersing themselves in the story.

The analysis carried out still reveals that the virtual reality contents are not among the priorities of the productive routines of these reference newspapers. In this sense, an irregular publication frequency has been identified, so that applications can go months without publishing any video. NYT VR, which has the highest publication frequency, has reached an average of 2.5 videos per month. Thus, hypothesis 1 which foresaw a low publication frequency in the 360-degree content available in the analyzed apps is confirmed.

Although the results of this study confirm the interest of the media in investing in a business model in which immersive journalism is contemplated through the development of content for a 360-degree app, it is necessary to bet on more innovative initiatives, to experiment narratives with a digital avatar in which the user also participates in the construction of the story. The idea, in this case, is for

the user to go from observer to participant, as proposed by De La Peña *et al.* (2010) and Domínguez-Martín (2015).

The innovation should even contemplate the production of exclusive content for the applications since the analyzed videos are also available on the newspapers' YouTube channels or websites. In this way, immersive journalism would allow the user more innovative virtual reality experiences, such as the combination of levels of spatial and sensory immersion with elements of augmented reality. As part of the innovation, one could work on topics related to hard news, which appear in the sample of this research with a very low frequency, so that soft news predominate.

This study, despite its limitation, sheds light on how virtual reality journalistic content is being produced. However, to answer specific questions about the production strategies of this type of content and the business model adopted by each media outlet, it is required to do field research with interviews with professionals for future work. Similarly, it is necessary to know details regarding the consumption of this type of content.

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