



Article

Immersive Journalism: Advantages, Disadvantages and Challenges from the Perspective of Experts

Susana Herrera Damas ^{1,*} and María José Benítez de Gracia ² ¹ Departamento de Comunicación, Universidad Carlos III de Madrid, 28903 Getafe, Madrid, Spain² Facultad de Humanidades y Ciencias Sociales, Universidad Isabel I, 09003 Burgos, Castilla y Leon, Spain; mariajose.benitez@ui1.es

* Correspondence: dherrera@hum.uc3m.es

Abstract: The aim of this text is to analyze the future of immersive journalism from the perspective of experts now, in a moment when the initial experimental stage seems to have passed given the smaller number of pieces being today produced by leading media. To do this, we conducted two focus groups with 15 international leaders in the field, including both professional and academic points of view. We asked them about the main strengths, weaknesses, challenges and how to overcome them so that immersive journalism has continuity in the future. The results reveal few differences between the views of academics and practitioners, especially regarding the strengths and weaknesses of this new narrative, which is as versatile as it is complex. Most of them agree that immersive journalism is still in its experimentation stage regarding its production, although there is a positive perspective regarding the sustainability of this format in the near future. Both groups agree on the need to continue testing to understand this new narrative language and insist on the need to introduce this knowledge into journalism schools, both theoretically and practically.



Citation: Herrera Damas, Susana, and María José Benítez de Gracia. 2022. Immersive Journalism: Advantages, Disadvantages and Challenges from the Perspective of Experts. *Journalism and Media* 3: 330–347. <https://doi.org/10.3390/journalmedia3020024>

Academic Editors: Sarah Jones and Joshua A Fisher

Received: 25 January 2022

Accepted: 15 April 2022

Published: 12 May 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Keywords: immersive journalism; immersive feature; 360° video; prospective; future; focus groups; Spain

1. Introduction

In 2011, researcher Nonny De la Peña and Professor Robert Hernandez participated in a conference at the University of Southern California that was focused on the economic precariousness and adversity faced by some groups. De la Peña then suggested an idea to her colleague: “Look at this person. Imagine what it would be like to be standing there, hungry, waiting in those food lines” (Hernandez 2018). A year later, De la Peña managed to materialize this idea in the project “Hunger in Los Angeles”, which recreated the diabetic crisis suffered by a person while waiting for their turn at a food bank. The researcher and her group, Immersive Journalism¹, had developed a complex piece of equipment designed at the University’s ICT Mixed Reality Lab, which made it possible to recreate this situation in a CGI environment so that the viewer could visualize and walk through the scene from a first-person perspective, approaching and moving around the person who had collapsed to the ground (De la Peña 2015).

Other works by the group, directed by De la Peña, have also been well received and have been awarded and exhibited at numerous meetings and festivals, in forums and conferences and in museums. In 2014, this group presented “Project Syria”, a piece that narrates the impact of war on children (De la Peña 2015). Along with these first pieces, Emblematic Group has produced numerous features, leading projects in this field through the use of advanced digital composition techniques such as photogrammetry and videogrammetry. Two of these examples are “After solitary”, produced in 2017 in order to denounce the psychological damage that isolation punishment can cause in prisoners, and also “Greenland melting”, a piece that tries to show the effects of climate change during an expedition that NASA carried out in Greenland (Frontline and Emblematic 2018).

Apart from De la Peña and her team's contribution, in this first stage, we also find journalistic pieces produced through CGI (computer generated imagery). One of the first ones is the "Harvest of change" project, a 2014 piece published by the Des Moines Register newspaper that recreates the daily life of a family of farmers in Iowa (Domínguez 2015, p. 418). To do this, pieces were recorded in 360° video, and high-resolution photographs were taken to recreate a three-dimensional graphic environment.

Another similar project is the one published by The Wall Street Journal, in April 2015, entitled "Is the Nasdaq in another bubble?". The feature focuses on the evolution of this stock index over the last 21 years. A 3D graph of a roller coaster represents this index that rises and falls based on the values of different companies in different periods.

Finally, in this first stage, the project "6 × 9: a virtual experience of solitary confinement", published in April 2016 by The Guardian, denounces the psychological damage that this type of punishment can cause to prisoners (Davies 2016). The viewer is placed in an isolation cell recreated with the same dimensions and characteristics as those of a prison in the US and can even hear real voices and sounds.

Although De la Peña had already been working on this type of representation since 2007 mainly to address social issues centered on the defense of human rights, it was precisely the attempt to transfer and present the "Hunger in Los Angeles" project to the Sundance Independent Film Festival that gave definitive impetus to this new journalistic modality, which she and her team had named immersive journalism just a year earlier defining it as "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).

It was during a conference in which De la Peña gave an account of the difficulty of moving the equipment when a student named Palmer Luckey offered to help her with a project he had in mind: the Oculus Rift virtual reality goggles system. De la Peña considered the young man's offer, and he went on to work in her laboratory. Three years later, his recently founded company, Oculus Inc., would be bought by Facebook for \$2 billion (Zuckerberg 2014).

Meanwhile, on the other side of the US, in New York, Ignacio Ferrando, a Spanish specialist in panoramic and spherical photography, was observing with Joergen Geerds the structure that Sony Ericsson had commissioned from the latter to create a spherical video with one of the company's telephones. Having seen this, Ferrando had the idea of also creating a structure for GoPro action cameras to record spherical video in the same way but with higher quality. Thus began the project of what would be the first rig used to record 360° video, a more accessible and cheaper piece of equipment than those that existed at the time (Ferrando 2016).

From the coming together of these two systems, virtual reality glasses and recording equipment, comes a new format that allows narration from real images with 360° video. Although this recording technique was not new, the use of this equipment achieved a very significant reduction in the cost of these recordings, facilitating their rapid adoption and extension to a wide range of fields².

This ability to represent scenarios in such an innovative way did not go unnoticed by the media ecosystem involved in the search for new formulas that would guarantee their survival in a "fragmented and viral media scenario" (Martínez Rodríguez and Torrado 2017, p. 148).

Gradually, some of the most prestigious media outlets joined this way of reporting events, and, from April 2015, several began to adopt it, especially during the period between 2015 and 2018. The first to do so was The New York Times, in April 2015, with the feature "Walking New York". It was followed by Discovery, USA Today, Associated Press, The Washington Post, ABC News, Frontline, CNET, The Wall Street Journal and Vice News, as well as European media such as Euronews, the BBC, RTVE or RT and production companies specializing in this format such as RYOT, Vrse or Jaunt.

Immersive journalism is a form of journalism characterized by the representation of events on a spherical stage generated from real images and which the viewer accesses from a first-person perspective that he or she controls at will, giving the sensation of being present in the place where the events have taken place (De la Peña et al. 2010; Domínguez 2015, p. 2; Owen et al. 2015; Dolan and Parets 2015; Doyle et al. 2016; Sirkkunen et al. 2016; Pérez-Seijo 2016; Sidorenko et al. 2017, p. 103; Hardee and McMahan 2017, p. 4; Baía Reis and Coelho 2018, p. 3; Gynnild et al. 2021, p. 2). In this new way of creating journalism, “the representations can be interpreted, experienced and responded to as being real” (Sirkkunen and Uskali 2019, p. 2801). This correlation between the actions that the subject carries out, such as turning one’s head and the reactions of the setting, creates the illusion of being inside the image (Domínguez 2017, p. 5), or place illusion (Slater 2009). In this way, virtual reality experiences not only feel more real than other journalistic storytelling formats but also offer the advantage of creating a strong sense of emotional connection to people, events and places (Suh et al. 2018; Baía Reis 2021; Gynnild et al. 2021, p. 2). Some authors have linked this response with the ability to generate empathy (De la Peña et al. 2009; Visch et al. 2010; Slater et al. 2013; Milk 2015; Kool 2016; Jones 2017; Robertson 2017; Shin and Biocca 2017; Sundar et al. 2017; Archer and Finger 2018; Sánchez Laws 2020), although there is not yet enough scientific evidence that this is true since particular cognitive factors also play a role (Fisher 2017; Shin 2018; Van Damme et al. 2019).

Immersive journalism with spherical video provides a series of advantages that add value and distinguish it from other narrative formulas. In fact, before this journalistic modality even had a name, some authors had already anticipated its advantages. Among them (Benítez and Herrera 2020):

1. The immersion of the spectator in the event: by putting on the viewfinder, the spectator is isolated from the real physical environment, and thus they only see and hear what is reproduced through the viewfinder. In fact, this isolation from the physical environment can create the danger of knocking into things, for example, when the viewer walks.
2. The representation of a spherical stage through 360° video with a three-dimensional appearance and a certain level of depth.
3. The control of the point of view by the spectator. By moving their head, the viewer modifies the field of vision in a way that is similar to the human gaze.
4. The use of spatial audio. This technology is essential to ensure that the viewer perceives the sound as coming from the direction in which it is produced.
5. The more active role of the spectator within the event, whether as an observer, as a character or even as the protagonist of the action that is being represented.
6. The sense of presence. The spectator can perceive that they are in the place where the events are taking place and react to them as if they were there, something which, as can be understood, provides important advantages over conventional narrative.

In Spain, we witnessed a rapid adoption of this format by some media at the beginning of 2016 and a progressive popularization in 2017 due to the fact that it was then that several local and regional media began to produce them experimentally (Benítez and Herrera 2018). However, this production slowed down almost entirely in both large media and digital natives in 2018 (Pérez-Seijo 2021). Since then, there has been a progressive decline (López Hidalgo et al. 2022) that has become more abrupt during the global crisis, which, logically, has not helped either. This type of production raises doubts about the sustainability of this form of journalism today, one that faces many challenges but which, at the same time, offers undeniable potential³ and opens new scenarios on new platforms (Baía Reis and Ashmore 2022).

2. Methods

In this context, the question arises as to what to expect from immersive journalism from now on. This is therefore the general objective of this research, which focuses on

examining the prospects for immersive journalism with 360° video from the perspective of experts. More explicitly, the specific research objectives we are pursuing are:

SO1: To examine the strengths and weaknesses of immersive journalism.

SO2: To explore what the main challenges are and how to overcome them.

Since our research is exploratory in nature, we limit ourselves to raising a few research questions, instead of posing hypotheses through formally expressed propositions that attempt to provide indications about the relationships that exist between the variables (Wimmer and Dominick 1996, p. 27). To answer each of these questions, we specify them in more specific ones. Subsequently, to operationalize each of the general questions, we convert them into an equal number of general variables that we then continue to operationalize in intermediate variables (Del Río and Velázquez 2005, p. 61). The scheme is summarized in the following Table 1:

Table 1. Questions and variables used in the research.

Main Question	Main Variable
Which are the strengths and weaknesses of immersive journalism?	Strengths and weaknesses of immersive journalism
Specific Questions	Middle Variable
What are the strengths or advantages of immersive journalism?	Advantages of immersive journalism
What are the main weaknesses or disadvantages of immersive journalism?	Disadvantages of immersive journalism
Main Question	Main Variable
What are the main challenges of immersive journalism and how to overcome them?	Challenges of immersive journalism
Specific Questions	Middle Variable
What are the most important challenges immersive journalism faces?	Challenges facing immersive journalism
How can these challenges be overcome?	Tips for overcoming the challenges of immersive journalism

To address these objectives, we employed a qualitative and exploratory methodology by conducting two focus groups. This technique consists of asking a series of questions to one or more groups of participants with the aim of gathering their responses while generating and analyzing the interaction between participants (Barbour 2007, p. 27). The underlying idea is that interviewees talk about different issues in a relaxed and informal atmosphere and exchange information with each other and with the interviewer (Kitzinger 1999; Greenbaum 1998, 2000; Bloor et al. 2001; Puchta and Potter 2004 or Hernández et al. 2014, p. 418). The constant interrogative and comparative method it requires avoids impressionistic bias from the researcher (Barbour 2007).

In this case, we conducted two focus groups:

1. One to ascertain the views of academic experts who have studied immersive journalism in depth;
2. Another to explore these issues from the perspective of professionals who have had to face the different technical challenges related, above all, to its production and distribution.

The concept of expert has been approached and considered in multiple disciplines. For Skjong and Wentworth, it refers to “individuals with knowledge and experience about a specific subject, system or field” (Skjong and Wentworth 2001, p. 4). Other authors such as McGartland et al. (2003) only take into account the number of publications or experience as the basic selection criteria. For Escobar-Pérez and Cuervo-Martínez, these are “people

with experience in the subject, who are acknowledged by others as qualified experts on it, and who can provide information, evidence, judgments and assessments” (Escobar-Pérez and Cuervo-Martínez 2008, p. 29).

Since the identification of experts is a critical part of validating our methodological tool, we follow a series of selection criteria, based on Skjong and Wentworth (2001, p. 4), which imply that the following four requirements are fulfilled (Skjong and Wentworth 2001, p. 4):

1. Experience in performing judgements and making decisions, based on evidence of expertise, e.g., degrees, research, publications, positions and experience, awards, etc.;
2. Reputation in community;
3. Availability and willingness to participate;
4. Impartiality and inherent qualities such as self-confidence and adaptability.

Following the criteria of Skjong and Wentworth (2001), we created a database with immersive journalism experts that we arranged around two groups: academic and practitioners. In the first one, we included researchers having authored prominent contributions in leading academic journals and with a well-recognized reputation in the immersive journalism field. In the practitioners’ group, we included participants with experience in the production of these types of pieces and who, likewise, have good reputation in the field. This distinction was made regardless of whether this activity was carried out in the university or in the commercial sector.

To set up both groups, and after an exhaustive refining process, we contacted a total of 24 experts through an email invitation, although not everyone was able to participate. Finally, the group of academics was made up of eight people, and the group of professionals consisted of seven, in line with what is generally accepted (Krueger and Casey 2000). The interviewees came from Spain (7), the United States (3), Portugal (1), Norway (1), Colombia (1) and Brazil (2). In the following Tables 2 and 3, we present a brief biographical profile of each of them:

Table 2. List of participants in the academics’ focus group.

Surname	Name	Biographical Profile	URL
Baía Reis	António	Researcher and professor at the Center for Media and Communication of the University of Passau in Germany. Ph.D. in Digital Media with a focus on immersive media.	www.antonibaiareis.com (accessed on 19 March 2022)
Blein	Jorge Esteban	Professor of immersive storytelling. Ph.D. Cum Laude in cinematography; he has written and directed multiple VR 360-3D fiction pieces.	https://distritoxr.com/cuartapared-vr/ (accessed on 19 March 2022)
Domínguez Martín	Eva	Holds a degree in Journalism from the Autonomous University of Barcelona. In 2013, she defended her first doctoral thesis on immersive journalism.	www.evadominguez.com (accessed on 19 March 2022)
Barbosa	Suzana	Professor in Contemporary Communication and Culture at the Federal University of Bahia (UFBA). One of the directors of the research Group of Online Journalism (GJOL).	-
Sánchez Laws	Ana Luisa	She is an Associate Professor in Media at the Volda University College, Norway. She had developed theoretical and practical work within the area of immersive journalism.	-

Table 2. *Cont.*

Surname	Name	Biographical Profile	URL
Pérez-Seijo	Sara	Ph.D. in Communication and a researcher at the University of Santiago de Compostela. Her research focuses on the study of immersive narratives.	-
Sidorenko	Pavel	Ph.D. in Communication and a Master's in social communication. Author of numerous publications on new narratives.	https://loft360.wordpress.com (accessed on 19 March 2022)
Lima	Lucielle	She has been a Ph.D. student at the Federal University of Bahia in Brazil since 2018, working on immersive journalism.	-

Table 3. List of participants in the professionals' focus group.

Surname	Name	Biographical Profile	URL
Coloma	Javier	Co-founder of Zakato, a production company specializing in 360° video and immersive narratives, where he has developed and directed a great many 360° projects.	-
De la Peña	Nonny	She is an American journalist, documentary filmmaker and entrepreneur. She is the founder and CEO of Emblematic Group, a digital media company focused on immersive virtual, mixed and augmented reality.	https://emblematicgroup.com (accessed on 19 March 2022)
Ferrando	Ignacio	A specialist in 360° photography and video, virtual reality and augmented reality. Founder of one of the first production companies specializing in virtual reality and immersive experiences.	www.abaco-digital.es/web/es/ (accessed on 19 March 2022)
Hernandez	Robert	He is a professor of professional practice at USC Annenberg. His primary focus is exploring the intersection of technology and journalism. He produces VR experiences under his brand: JOVRNALISM.	http://blog.webjournalist.org (accessed on 19 March 2022)
Prat	Clàudia	She is a journalist specializing in 360-degree video, and she has contributed to around forty 360-degree video stories working for media organizations such as The New York Times, Univision and Associated Press.	https://webdocc.net (accessed on 19 March 2022)
Raya	Laura	Ph.D. in Computer Engineering, Virtual Reality Project Manager at U-tad and a university professor. She is a member of the European projects The Blue Brain and The Human Brain Project.	www.gmr.es/~lraya/ (accessed on 19 March 2022)
Rojas Roa	Daniel	He is co-founder of 3GO° Video, where he works in the area of creation, production, direction and editing of virtual reality content.	www.danielrojasroa.com (accessed on 19 March 2022)

The two sessions, held online via Blackboard Collaborate on Friday 10 December 2021, were guided by a list of the following 4 questions, aligned with the specific objectives and research questions of our study:

1. What strengths or advantages do you consider immersive journalism has over other forms of journalism?
2. And what do you consider to be its main weaknesses or disadvantages?
3. What are the most important challenges immersive journalism faces?
4. From your point of view, how can these challenges be overcome?

We followed a dual-moderator focus group, which involves two moderators working together, each performing a different role within the same focus group. The division of roles ensures a smooth progression of the session and ensures that all topics are covered (Nyumba et al. 2017, p. 24). The moderators have a professional background and previous experience in conducting interviews and this type of debate.

Before proceeding to the debate, and in line with the extended focus group modality, we posed a total of 4 questions, leaving a minute and a half of reflection after each one so that participants could think about their answers and thus make the discussion more productive. After this time, a turn to speak was followed so that each participant could offer their answers.

The intervention of each of the groups lasted approximately 1:45 min. The language used was Spanish, except during the interventions of Nonny de la Peña, who felt more comfortable speaking in English, although she could easily understand Spanish.

After the debate, we transcribed the interviews, modifying some grammatical aspects to correct mistakes that are typical of spoken language and colloquial register. After transcribing the results, we double-reviewed the two sessions again to ensure the literality of all the transcribed content.

Data coding was accomplished in two stages. Following Nyumba et al. (2017, p. 22), the initial coding involved generating numerous category codes and listing emerging ideas and keywords. During the second stage, we deleted, combined and subdivided the former coding categories. After processing the information, we outlined the findings in the different results that we now present in a pointwise format (Nyumba et al. 2017, p. 24).

Finally, before showing the results, it is important to clarify some limitations of our study which refer to the greater number of Spanish authors in the focus groups, to the undeniable impact that the global crisis caused by COVID-19 has had on this kind of production that has decreased worldwide and to the need of having VR glasses to visualize the content, something that prevents reaching a larger audience.

3. Results

3.1. The Strengths of Immersive Journalism

One of the main advantages of immersive journalism is the ability to transport the viewer to places that are not easily accessible, or are even remote (Blein), which brings them “to different emotional and physical human geographies” (Baía Reis) by placing them “in the center of a space, of a reality or an event so that, having the sensation of really being there, this sensation of presence allows them to better understand a certain reality, to obtain a more complete image, to put themselves in the shoes of another person or to better understand a certain event” (Pérez-Seijo).

For Clàudia Prat, immersive journalism allows the viewer to be “tele-transported” as no other medium has done before. The recently presented Space Explorers exhibition, *The Infinite*⁴, exemplifies in a very clear way some of these advantages that communicate details that might seem mundane but that add so much value to the story and generate the experience of being teleported in a unique way. Prat considers it revolutionary:

“The incredible thing about immersive journalism is that it allows us access to spaces and places where the audience can’t be [...]. For example, to go back to this space project, you are inside the Space Station, and you can see all the stickers, all the details that for years the astronauts have had in their home living outside the planet Earth [...]. In immersive journalism, the magic is that you are there and you explore it from your body or, at least, with 360 video, from your head you can see and read the space with your body. That is what is revolutionary about immersive journalism and that is surely what has led those of us who are here to experiment in this medium, isn’t it? It is unique, no other medium can do it: we have not been able to teleport in this way before” (Prat 2021).

In a similar sense, Robert Hernandez adds that the concept of presence can refer to a place but also to a person, such as a migrant whom the viewer has never met and only sees from a distance in the news. And he adds that this is a highly relevant advantage.

In addition to the capacity for presence, Domínguez highlights other aspects, such as a higher sensory level and less cognitive effort, which makes it easier to generate experiences and allows for action. And this connects with the demands of younger audiences:

“For me, immersive journalism has two qualities: one is the ability to immerse [oneself] in a different space, and the other is the ability to act. These are the two great characteristics that being immersed in any space allow, and these technologies underline this. So what are the strengths and advantages? That there is less cognitive effort with these formats because they are more sensory. The three-dimensionality, the sensory spatiality requires less cognitive effort [...]. And, if you combine all that with interactivity, then that ability to have an experience, right? It’s not just seeing or listening and feeling but also acting. And what is the advantage of this? Centennials are looking for experiences” (Domínguez 2021).

Laura Raya also highlights the “great leap” and the “enormous advantage” that the viewer is no longer just someone to whom the news is told but becomes a “user” who can interact with the information, even if that interaction simply consists of 360° movement. In similar terms, for Ignacio Ferrando, interactivity is one of the greatest advantages of these technologies:

“Yes, it is clear that the main advantage of 360 video, 360 photo, of immersive things, is interactivity, that is clear. It’s not the same to be sitting in a place watching TV or watching the news as it is to put on a pair of glasses and turn it around or even turn it around on a cell phone. That’s the absolute main advantage and that allows for immersion in a story” (Ferrando 2021).

As a consequence, that “ability to generate the perceptual sensation of presence” (Raya) generates a greater “emotional reach” (Blein), a greater “empathetic connection” (Baía Reis) which, in turn, offers “a great potential for interaction, a more effective involvement” (Lima) and a “different perspective from the one we normally have” (Baía Reis). Empathy is also something that Daniel Rojas highlights:

“I think that the strength of immersive journalism compared to other tools and media is that it generates empathy, which allows you to understand more about the other person’s situation, and it also generates a context. It places you in another reality and that allows you to understand and live that experience. You no longer have to imagine it as when it is published in a newspaper, on the radio or on television, but now you are living it and that will allow you to understand the explanation of what is happening” (Rojas 2021).

In turn, that greater emotional reach allows the audience to “connect with the content in another way” (Sidorenko) and the viewer to feel present within the event and be able to empathize with the people and the story:

“Whether it’s 360 video or computer-generated content, virtual reality allows you to feel present and this breaks all the schemes because, really, it’s you in the news. You don’t hear it from someone else: you interpret it” (which not only allows you) “to have a better allocation of information, but it is true that you empathize more with the different people and with the content that can be followed from there” (Raya 2021).

Sidorenko highlights the opportunity that all this represents today for journalism in a context in which we are so “powerfully infocinated”, we “consume in a very nomadic and rapid way in social networks”, and the disinformation “industry” poses incredible challenges:

“For these reasons, immersive journalism could end up doing what slow journalism is trying to do, which is to motivate the person to stop and see, to understand something, and to comprehend what is happening, and obviously, what this allows is to bring them closer” (Sidorenko 2021).

In a similar vein, Professor Barbosa points out the potential of these technologies in allowing journalism to reconnect with its audience:

“We know that journalism is going through many crises at the moment. One of them has to do with the issue of credibility, or the fact that the audience is somewhat distant, and we also have the whole fake news movement. So, this offers an opportunity to recover the value of experiencing journalism” (Barbosa 2021).

In addition to the above, Jorge Esteban Blein adds the advantage of the “wow” effect that this kind of technology continues to have:

“I thought it would’ve disappeared in these 5 years, but no way! It’s still very much alive. It’s the wow effect of VR itself, and journalism has to continue using it extensively because the vast majority of people still haven’t tried virtual reality glasses. So that effect is still there. At some point, the excitement will wear off, just like when people got used to the cinema over a century ago (...). That fairground feeling. I think in the case of VR, it’s still there for most people, and well, the feeling of being present and sharing the embodiment that VR generates is something that I think is fundamental for emotional journalistic content” (Blein 2021).

Consequently, all of these advantages make it possible to offer “a first draft of the story that’s much richer if you consider that it can capture all the aspects of a bodily presence that a person experiences in the events, with limitations and possible distortions, of course, but it’s like a new layer that’s added to this snapshot of events” (Sánchez Laws).

3.2. Disadvantages of Immersive Journalism

Among the shortcomings of immersive journalism, some of the experts agree that it has one very basic flaw, which is the need to have devices that not everyone possesses. Moreover, this situation affects both smartphones and virtual reality glasses.

“One of the weaknesses of immersive journalism and, in this case, I’ll focus only on immersive journalism that uses virtual reality, is that it needs an accessory, which is the glasses. If the journalist or media wants the user to have a real, 100% sensory experience, or the most immersive experience in terms of sensation, then it would be a drawback” (Pérez-Seijo 2021).

“The glasses are a problem. For example, how do you expect the public to experience our content if they don’t have the glasses?” (Barbosa 2021).

António Baía Reis adds the highly physical risk of cyber-sickness or dizziness when pieces are not well produced, while Ana Luisa Sánchez Laws points to the risk of “sensory hyper-saturation”:

“The emphasis on sensory experience can create a lack of space for interpretation and reflection –that critical level of distancing that Brechtian theatre speaks of–. At the same time, sensory hyper-saturation can be a mechanism used as an exclusive market logic that minimizes the civic function of journalism. Along these lines, I would add María Ressa’s criticisms of the current information ecosystem, the role of journalists, and the digital autocracy in which actors such as Facebook/Meta and other social media operate, and which are currently investing in virtual reality” (Sánchez Laws 2021).

Coloma adds that the productions are very expensive:

“Disadvantages? The high cost of everything. Putting together any small story costs a lot of money. Those of you doing research know that every time you need to start a new project at the university you have to ask for huge budgets. I still think it’s a tool that will be used for very specific things” (Coloma 2021).

Along the same lines, Barbosa mentions the lack of funding faced by many large journalistic companies, while Baía Reis and Sidorenko point to monetization as another serious weakness.

We also find other shortcomings related to ethical implications due to the power of immersive narratives, which can leave the viewer in a situation of great emotional vulnerability (Sánchez Laws 2020; Benítez et al. 2021). In this sense, for De la Peña “it’s a

responsibility of any of us to think that this media has the kind of power and the potential that it does, and perhaps, re-visit what the best practices are”:

“How do we apply what are the best practices that we have learnt in journalism previously to this explosion that is going to happen? How do we talk about the fact that, in a situation, maybe a bomb goes off? Are we going to let people step over the bodies? I think this is a moment in which we need to start defining what may work, what may not work, and you have to imagine that future now, because we have not seen it yet” (De la Peña 2021).

Blein also considers that, in general, VR is so powerful that we have to be very careful with how it is used because of the emotional and psychological damage that might be caused by its improper use.

He adds these implications as an imminent risk that could occur in the future, and thus he thinks it needs to be heavily regulated:

“We know that there have always been ethical issues in journalism. To what extent can showing an image, or not showing it, hurt a viewer’s feelings? Here the issue is not that it can hurt them. The point is, it can upset them psychologically in a very profound way if we put them in the middle of a tragic situation, or in the middle of a place that can be... There’s also a strong factor of morbid fascination. So, if journalism is able to manage the extent to which it can put the spectator in a place that’s not good for their health and emotional well-being then... We’ve already seen graphic images in recent years that seem to indicate there’s almost no limit, right? Children’s corpses” (Blein 2021).

In more general terms, several of the experts agree in pointing out the scarcity of narrative and technological knowledge when it comes to producing this type of journalism, which is still an “emerging and experimental” practice (Baía Reis). Similarly, as Robert Hernandez argues, “The disadvantage is that it’s a new culture, a culture not only for the user, but for the newsroom as well”. At the same time, Eva Domínguez points out that not all productions have achieved a sufficient level of quality and narrative, and technological knowledge is still lacking:

“It’s true that there’s been a lot of production, but we also have to ask ourselves how much of that production had the level of quality and attraction for the audience that made it worth the effort to watch it in 360. In that sense, I think we have to put ourselves in the citizens’ shoes, don’t you think? I believe we still haven’t done that (...) There are many people who are producing and experimenting, but this is changing the way narratives are being produced. We’re talking about three-dimensionality. We’re talking about spatiality. These are spatial narratives and that... we don’t know how to do yet. We’re still creating the language. So those are the disadvantages and drawbacks (...). In this context, there are many negatives for journalism in incorporating these formats” (Domínguez 2021).

In this regard, some of the experts point out that the media have made several mistakes. On the one hand, there has been a certain amount of confusion and lack of understanding in relation to this format, which requires “building a storytelling” and not just “grabbing the camera and putting videos on YouTube” (Sidorenko). In turn, as the media have been “somewhat motivated by their eagerness to be the first to try out the technology (...) as a differentiating value, and to have a competitive edge over other media”, they have begun to produce this type of content intensely with “an almost daily rhythm”, perhaps replicating “the logic of conventional audio-visual media”, when in reality, “the conventional model truly clashes with the unique features of the spatial narrative”, which requires a lot of time in production, post-production, narrative design and consumption (Pérez-Seijo). The third mistake has been the attempt to direct this type of narrative at all types of audiences:

“At least from my perspective, the problem with this immersive digital journalism is that it’s interesting for a niche audience. And what the media have done is promote and sell this way of producing content as a format that might be of interest to the general public, which is not the case. Due to their own characteristics, these formats are more focused on certain audiences, such as those that are younger, due to their greater familiarity with video games or other types of content” (Pérez-Seijo 2021).

In this regard, Baía Reis points out that the situation of technological frenzy faced by newsrooms does not leave enough time for the media, production companies or academics to assimilate all these innovations in a more structured way:

“I think it’s experimental. There are no standards. The emergence of new, associated technologies is becoming more and more frenetic and crazy. We’re just trying to understand 360, yet we already have full blown, volumetric virtual reality. Just as we were starting to understand volumetrics, now integrated immersive ecosystems with artificial intelligence are on the way. We just don’t have enough intellectual or academic capability for all of this. It doesn’t mean we shouldn’t think about it. It just means we should think about it with the idea of slow (journalism) in mind” (Baía Reis 2021).

3.3. Challenges Facing Immersive Journalism

Among the challenges that immersive journalism must confront, several stand out that could affect different phases of production. To begin with, Hernandez points to the lack of knowledge about this technology on the part of some individuals in charge of newsrooms:

“The biggest, most serious challenge for me is with those in charge of newsrooms; those who have been managers since before Internet, during Internet, during social networks, and in the cellphone era, who don’t move aside and adapt to the real world. The young people who are entering the field now get frustrated and go elsewhere” (Hernández 2021).

In a similar vein, De la Peña points to the challenge of applying everything that has been learned so far in immersive journalism to the explosion of this type of content that will be generated by imminent technological innovations. Similarly, Sánchez Laws asks herself how the civic role of journalism can be integrated into these technologies and adds the following challenges:

“The metaverse as a purely commercial space: clickbait, market logic, and the manipulative potential of technology are all challenges that will be present in the immediate future” (Sánchez Laws 2021).

Along with this situation, another challenge is understanding the audience, their preferences and their consumption patterns based on reception studies that include quantitative and qualitative questions: numbers and context, metrics, platforms, mobility, access models and consumption profiles; “What is this audience really willing to consume” (Lima). In a similar vein, Domínguez asks the following question:

“Where are the audiences? That’s the question we need to ask. The audiences, especially the generation we are going to target. That generation is the one that’s going to consume this technology. They want experiences more than anything else. They’re looking for experiences because they’re sociable, and they use social networks for that purpose. But it’s through this immersive technology that’s arriving just now” (Domínguez 2021).

Other experts point to the challenge of making technology accessible. For example, Raya mentions the importance of allowing information to be transmitted through different channels “because if not, it might be the coolest thing, but only about four people will see it, and that’s not the ideal situation” (Raya):

“I think that’s the main challenge –how to get there and how the spectator sees it–. And right now, it’s very limited. The truth is that the headsets that exist now, which are a lot better than before, are still heavy. They’re a hassle (...) Nobody’s going to watch a football game for an hour wearing one of those. It’s ridiculous. The productions we make normally don’t last more than 10 min, and that’s exactly the reason why: because nobody can stand any more” (Ferrando 2021).

Clàudia Prat also addresses the challenge posed by the publication of this type of content on platforms such as Oculus, Facebook and even YouTube, and she brings up the following question: “Who are we benefiting by publishing all these projects on platforms, when we don’t know what those platforms are going to do with our data, or the fact that

they use algorithms in very non-transparent ways". Faced with this reality, she poses the challenge of "how to create immersive journalism that is open" (Prat).

To all these challenges, De la Peña adds one more, which is that of trying to tell the story without being too explicit, as there are different perceptions regarding what kinds of images are acceptable: "I feel pretty strongly that you convey a story without having to be so graphic violent". Likewise, for De la Peña "it is so important now to be more inclusive and critical, inclusive with voices and critical of information", a challenge that is also supported by Hernandez:

"We have to be active as well as proactive so we can be inclusive about who is creating this content. It should not be only the rich (...) It has to be everyone, with all points of view, empowering all users to create content and tell their own story. That's extremely important, so that all people can be present in the future (...) We have to fight to include that point of view and put these new tools in the hands of all people so we can create a balanced world with the support of Facebook, Google, Apple, and Amazon, but with the independence of having the power of your data, your presence, and your work" (Hernandez 2021).

Baía Reis points to a strong paradigm shift in comparison to the 1990s when the (scarce) consumption of virtual reality was done in a very isolated way: with the arrival of certain platforms, "we are gradually entering a space where we can be there, with a very systematic, intuitive performance, talking to people everywhere". Along the same lines, Blein poses a challenge for immersive journalism to "get on the bandwagon of sociability":

"There's one thing I always say about immersive media, whether it's AR, VR, or extended reality. I think they'll either be sociable, or they won't. And for that reason, I think in applications and cellphones, what works the best are social networks(...). It is essential for journalism to also think about how it can jump on the bandwagon of sociability and how stories or experiences can be enjoyed from a social point of view (...). Regarding this social aspect, it's absolutely necessary that in some way, and I have no idea how, the journalistic profession should try to get its foot in the door and take advantage of positioning itself for when metaverses and extended realities become a phenomenon, and most of all, a social phenomenon" (Blein 2021).

Sidorenko also points out that "immersive journalism is faced with the need to evolve by providing more spaces related to socialization dynamics: forums, meetups, etc. In social networks today, loyalty and community-building is paramount (Discord, TikTok, Twitch, Patreon, etc.), and the metaverse reaffirms this need" (Sidorenko).

To a lesser extent, academics also face the theoretical and conceptual challenge involved in confronting a plethora of changes in grammar, codes and even paradigms, which is a question that "must be investigated in greater depth in order to reduce theoretical problems and make progress in these studies" (Lima 2021). In line with this idea, Sánchez Laws points out that for scientists, "the challenge is also to continue with research in this area despite the downturn in the market".

3.4. How to Overcome Challenges

When asked how these challenges can be overcome, Domínguez criticizes laying the blame on the audience for its lack of interest. Instead of trying to "make them literate", he proposes another attitude: that of being very humble, simply because "there is a lot of learning to be done":

"I think we have to be extremely humble. I think, sometimes, in journalism we have been carrying out our journalistic profession without knowing how the audience consumes our content, and what does or doesn't interest them. We've been working in journalism for more than a century using our journalistic instincts, but now we have more metrics. But even though we're still a sector that carries out journalism for the audience, we don't take the audience into account. So, the problem is not with the audience. The problem is with the journalistic sector. So, the problem is never the audience (...). We all agree

that there has been a lot of 360 video production that we haven't even watched ourselves" (Domínguez 2021).

Within this new context, it seems appropriate to assume that from this point forward, journalists should always be in beta mode:

"We're there, we're all experimenting, we're all learning, building this alphabet. But it's an alphabet that's constantly changing because language is changing, because technology is changing. So, we shouldn't pretend to know things because what's coming is always going to be like this. Because it's evolution. Technological evolution. Digital evolution, etcetera. We're evolving, so we'll never know everything. We're always in beta mode, and we're always going to be in beta mode. And we have to feel comfortable with it" (Domínguez 2021).

In the immediate future, it is advisable to take advantage of the current spaces as well, starting "with the little that can be done now within the productive logic of the media. Do they have Instagram? On Instagram, there's a fantastic augmented reality platform called Spark AR⁵. We should start there, so we can start developing" (Domínguez). And she continues, "At the same time", it would be a good idea for the media to make sure they're present in the new spaces".

In order to do so, and given the fact that they have structures that hinder "people from being up-to-date", Domínguez advises partnering with start-ups and other professionals who have the necessary capabilities, thereby searching for a way "to infuse yourself with innovation, and with knowledge that other people have, because it's impossible to do highly innovative things if you don't have people with engineering-type backgrounds, just to give one example" (Domínguez). Along the same lines, Baía Reis believes that "journalistic media have to get closer to people who are early adopters. Even though these people don't know what's going to happen in 10 years' time, they're already involved in such technology. They're already experimenting with it" (Baía Reis).

For his part, Coloma adds university education to the list as another very specific way of overcoming the diverse challenges faced by immersive journalism:

"We should invent something that could be used in classrooms so that students could work with devices that are not too complicated, but that would allow them to change the way of doing things, starting in the classroom. And from there, these new generations would enter the workforce with knowledge of what immersive journalism is all about. Because I get the feeling from what's happening, [...] that if we don't start developing in a different way, we're going to have to wait 10 to 15 years until everything is easier to use" (Coloma 2021).

"In turn", he adds, "the media should join forces with universities" (Coloma 2021). Moreover, with regard to teaching, Ferrando highlights the need to systematically organize knowledge in the form of guides and manuals because, in his words, "there are no books, no documentation, and no theory":

"Also, on the issue of education, and I do see this as important, with regard to universities, and most of all with the issue of technicians. I've been involved in this since it began, and. We just learned it by doing. The 360 cameras have been created by a few of us lunatics who have been making cameras, together with the people I collaborate with, and with brands that ask for feedback all day long... But we can safely say there are no books on this subject, whereas photography has many books... It's true that there are forums and all of those things. At an academic level, you have to give your students something more academic" (Ferrando 2021).

4. Conclusions

Our research allowed us to obtain a global and collective point of view regarding the future of immersive journalism.

We noticed a gap in the ability to transfer knowledge of production techniques linked to immersive journalism since they are very different from those of conventional audio-

visual narrative and also require finding formulas to connect with the audience. These limitations could be solved in two ways. Although there are some contributions based on how immersive storytelling can be applied (Owen et al. 2015; Doyle et al. 2016; Marconi and Nakagawa 2017; Jaunt 2017; Watson 2017; The Emblematic 2018), the publication of manuals or guides that collect a large part of the knowledge acquired by the producers is still needed.

On the other hand, it seems necessary to incorporate immersive journalism teaching in universities. In this regard, it should be noted that some initiatives have emerged such as a series of intensive courses that have been developed as part of a new Immersive Media BA and minor program at Columbia College Chicago (Fisher and Samuels 2021).

Aware of this initial stage of experimentation, we find a unanimous positive vision of the future of immersive journalism, whose consolidation will be decisive in the next two decades.

The results reveal similarities between producers and academics on the various issues involved. Specifically, we found a strong consensus in the areas of strengths and weaknesses. Among the strengths, the interviewees agreed on the importance of immersive journalism in transporting the viewer to remote places that are difficult to access, bringing them closer to new realities and placing them in the center of the situations, as if they were actually there. Moreover, the experts also highlighted the capability it offers for taking action, and for interactivity, which represents a great leap forward in terms of how information has been accessed to date, offering a different perspective, greater emotional reach, increased empathetic connections and more effective involvement with the content. In the current, multi-factor crisis afflicting journalism today, all of these advantages are of particular interest.

On the other side of the coin, however, professionals and academics agree that there are several weaknesses, such as the need for devices that not everyone has, as well as more specific physical and economic risks resulting from the continued high cost of the equipment.

The fact that the return on investment is not assured means that monetization remains an unresolved problem, as it paralyzes necessary experimentation. The experts refer to other weaknesses as well, such as those related to ethical issues (Kent 2015; Kool 2016; Madary and Metzinger 2016; Aitamurto 2018; Fisher and Schoemann 2018; Nash 2018; Muntean et al. 2019; Pérez-Seijo and López-García 2019; Sánchez Laws 2019; Benítez et al. 2021; Uskali and Ikonen 2021), which are exacerbated by the power of this technology. Furthermore, both narrative and technological knowledge is lacking when it comes to producing this type of journalism, which has resulted in the media having made several mistakes, one of which has been producing too much of this content without considering the complexity of this type of spatial narrative but also by massively directing it toward all kinds of audiences, when it seems more appropriate to produce specific items with a very defined purpose aimed at a “niche” audience.

Among the challenges, several were highlighted that affect different phases of production: the lack of a culture of innovation on the part of some newsroom managers; the challenge of applying all that has been learned so far to the next upsurge of this type of content; finding ways to integrate the civic role of journalism into all these technologies; and the crucial need to understand the interests of the audience, as well as what they are truly willing to consume. They also point to the difficult task of making technology accessible, preferably on platforms that are open and decentralized. Two of the experts add the challenge of making immersive experiences sociable, and two others refer to the need of telling immersive narratives in an inclusive manner.

As the challenges are numerous, the strategies to face them should also be diverse. To begin with, the experts agree on the importance of being very humble, as there is still “a lot of learning to be done”. In the immediate future, it seems advisable to take advantage of the current spaces that allow for the productive logic of the media while at the same time being present in the new spaces, including the corporate XR spaces that are already

in operation. Other proposals include partnering with start-ups and professionals who have the necessary capabilities, reinforcing the university-based training and gradually organizing the new knowledge into guides and manuals.

As future lines of research, we suggest (i) analyzing how users can experience stories and interact with information, (ii) establishing the immersive narrative rules based on reception analysis to determine which practices favor greater immersion and (iii) continued research on the best practices from an ethical point of view, given the great emotional vulnerability to which viewers are subjected, as stated by experts.

Author Contributions: Conceptualization: S.H.D. and M.J.B.d.G.; methodology: S.H.D. and M.J.B.d.G.; focus groups' conduction: S.H.D. and M.J.B.d.G.; focus groups' transcription: S.H.D. and M.J.B.d.G.; writing—original draft preparation, S.H.D. and M.J.B.d.G.; writing—review and editing, S.H.D. and M.J.B.d.G.; funding acquisition: S.H.D. All authors have read and agreed to the published version of the manuscript.

Funding: This work has been supported by the Madrid Government (Comunidad de Madrid-Spain) under the Multiannual Agreement with UC3M in the line of Excellence of University Professors (EPUC3MXX), and in the context of the V PRICIT (Regional Programme of Research and Technological Innovation).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Conflicts of Interest: The authors declare no conflict of interest.

Notes

- ¹ Nowadays called The Emblematic.
- ² Among them, the tourism (Matyushina 2022; Chang and Chiang 2022), museum (Çelttek 2021; Verde and Valero 2021) and educational sectors (Jones and Callaghan 2016; Pirker and Dengel 2021; Shadiev et al. 2021). It is also being used therapeutically in psychology clinics to correct certain anxiety disorders such as social phobia, vertigo, fear of flying, agoraphobia, etc. (Bender and Broderick 2021; Riva 2020). In the field of education, in 2016 Google launched the "Expeditions" initiative, which offers more than 1000 tours of different places in the world for students to discover and explore with the help of virtual reality glasses.
- ³ To promote the good use of this modality, in the book "Cómo producir reportajes inmersivos con vídeo en 360°" ("How to produce 360° video immersive features") (Benítez and Herrera 2020), we propose a total of 20 good practices that affect different moments of the production process; for instance, how to guide attention, how to generate the sensation of presence and good practices from an ethical point of view.
- ⁴ The Infinite is a Space Explorers exhibition, produced by PHI and Felix and Paul Studios in association with TIME Studios. <https://theinfiniteexperience.world> (accessed on 19 March 2022).
- ⁵ <https://sparkar.facebook.com/ar-studio/> (accessed on 19 March 2022).

References

- Aitamurto, Tanja. 2018. Normative paradoxes in 360 journalism: Contested accuracy and objectivity. *New Media and Society* 21: 319. Available online: <https://doi.org/10.1177/1461444818785153> (accessed on 19 March 2022). [CrossRef]
- Archer, Dan, and Katharina Finger. 2018. Walking in Another's Virtual Shoes: Do 360-Degree Video News Stories Generate Empathy in Viewers? *Tow Center for Digital Journalism Report*. pp. 1–70. Available online: https://www.cjr.org/tow_center_reports/3virtual-reality-news-empathy.php (accessed on 19 March 2022). [CrossRef]
- Baía Reis, António. 2021. Immersive Media, Social Change, and Creativity: A Framework for Designing Collaborative 360° Video Productions. Ph.D. thesis, Universidade do Porto, Porto, Portugal. Available online: <https://hdl.handle.net/10216/132047> (accessed on 14 January 2022).
- Baía Reis, António, and António Fernando Cunha Castro Coelho. 2018. Virtual Reality and Journalism: A gateway to conceptualizing immersive journalism. *Digital Journalism* 6: 1090–100. [CrossRef]
- Baía Reis, António, and Marca Ashmore. 2022. From video streaming to virtual reality worlds: An academic, reflective, and creative study on live theater and performance in the metaverse. *International Journal of Performance Arts and Digital Media* 18: 7–28. [CrossRef]
- Barbour, Rosaline. 2007. *Doing Focus Groups*. Newcastle Upon Tyne: Sage.
- Bender, Stuart Marshall, and Mick Broderick. 2021. Virtual Reality Exposure Therapy. In *Virtual Realities*. Cham: Palgrave Macmillan, pp. 77–107.

- Benítez, María José, and Susana Herrera. 2018. Los primeros pasos del reportaje inmersivo a través de vídeos en 360°. *Historia y Comunicación Social* 23: 547–66. [CrossRef]
- Benítez, María José, and Susana Herrera. 2020. *Cómo Producir Reportajes Inmersivos con Vídeo en 360°*. Barcelona: UOC.
- Benítez, María José, Sara Pérez-Seijo, and Susana Herrera. 2021. Ethics in 360-Degree Immersive Journalism. In *News Media Innovation Reconsidered: Ethics and Values in a Creative Reconstruction of Journalism*. Edited by María Luengo and Susana Herrera-Damas. Hoboken: John Wiley & Sons.
- Bloor, Michael, Jane Frankland, Michelle Thomas, and Kate Robson. 2001. *Focus Groups in Social Research*. Newcastle Upon Tyne: Sage.
- Çeltek, Evrim. 2021. Digital Art Events and Digital Art Museums. In *Impact of ICTs on Event Management and Marketing*. Hershey: IGI Global, pp. 123–38.
- Chang, Hsuan Hsuan, and Chin Chung Chiang. 2022. Is virtual reality technology an effective tool for tourism destination marketing? A flow perspective. *Journal of Hospitality and Tourism Technology*. [CrossRef]
- Davies, Caroline. 2016. Welcome to Your Virtual Cell: Could You Survive Solitary Confinement? *The Guardian*. Available online: <https://www.theguardian.com/world/2016/apr/27/6x9-could-you-survive-solitary-confinement-vr> (accessed on 13 January 2022).
- De la Peña, Nonny. 2015. The Future of News? Virtual Reality. *TED Talk*. Available online: https://www.ted.com/talks/nonny_de_la_pena_the_future_of_news_virtual_reality (accessed on 15 January 2022).
- De la Peña, Nonny, Peggy Weil, Joan Llobera, Elias Giannopoulos, Ausiàs Pomés, Bernhard Spanlang, Doron Friedman, María Sánchez-Vives, and Mel Slater. 2010. Immersive journalism: Immersive virtual reality for the first-person experience of news. *Presence: Teleoperators and Virtual Environments* 19: 291–301. [CrossRef]
- De la Peña, Nonny, Peggy Weil, Mel Slater, and María Sánchez-Vives. 2009. Virtual reality in the extreme: Experiencing and understanding violence. Paper presented at Art and Science: Exploring the Limits of Human Perception, Benasque, Spain, July 12–16.
- Del Río, Olga, and Teresa Velázquez. 2005. Planificación de la investigación en Comunicación: Fases del proceso. In *Investigar en Comunicación. Guía Práctica de Métodos y Técnicas de Investigación Social en Comunicación*. Edited by María Rosa Berganza and José Antonio Ruiz San Román. Madrid: McGraw Hill, pp. 43–76.
- Dolan, Devon, and Michael Parets. 2015. Redefining the Axiom of Story: The VR and 360 Video Complex. *Medium*. Available online: <https://medium.com/@devon.michael/redefining-the-axiom-of-story-the-vr-and-360-video-complex-bee3c20d69df> (accessed on 14 January 2022).
- Domínguez, Eva. 2015. Periodismo inmersivo o cómo la realidad virtual y el videojuego influyen en la interfaz e interactividad del relato de actualidad. *El Profesional de la Información* 24: 413–23. [CrossRef]
- Domínguez, Eva. 2017. Going beyond the classic news narrative convention: The background to and challenges of immersion in journalism. *Frontiers in Digital Humanities* 4: 10. [CrossRef]
- Doyle, Patrick, Mitch Gelman, and Sam Gill. 2016. Viewing the Future? Virtual Reality in Journalism. Knight Foundation by USA Today. Available online: <https://knightfoundation.org/reports/vrjournalism> (accessed on 12 January 2022).
- Escobar-Pérez, Jazmine, and Á. Cuervo-Martínez. 2008. Validez de contenido y juicio de expertos: Una aproximación a su utilización. *Avances en Medicina* 6: 27–36.
- Ferrando, Ignacio. 2016. Interview by María José Benítez. Face to face in-depth interview. April 19.
- Fisher, Joshua A. 2017. Empathic actualities: Toward a taxonomy of empathy in virtual reality. In *International Conference on Interactive Digital Storytelling*. Edited by N. Nunes, I. Oakley and V. Nisi. Berlin/Heidelberg: Springer, p. 10690. [CrossRef]
- Fisher, Joshua A., and Janice Tisha Samuels. 2021. A proposed curriculum for an introductory course on interactive digital narratives in virtual reality. In *Interactive Digital Storytelling*. Berlin/Heidelberg: Springer, pp. 462–77.
- Fisher, Joshua A., and Sara Schoemann. 2018. Toward an ethics of interactive storytelling at dark tourism sites in virtual reality. In *Interactive Digital Storytelling*. Berlin/Heidelberg: Springer, pp. 577–90.
- Frontline and Emblematic. 2018. Creating Virtual Reality Journalism: A Guide for Best Practices. *Frontline*. Available online: <https://www.pbs.org/wgbh/frontline/article/creating-virtual-reality-journalism-a-guide-for-best-practices> (accessed on 12 January 2022).
- Greenbaum, Thomas L. 1998. Common Mistakes in Focus Groups. In *The Handbook for Focus Group Research*. Edited by Thomas L. Greenbaum. Newcastle upon Tyne: Sage.
- Greenbaum, Thomas L. 2000. *Moderating Focus Groups: A Practical Guide for Group Facilitation*. Newcastle upon Tyne: Sage.
- Gynnild, Astrid, Turo Uskali, Sarah Jones, and Esa Sirkkunen. 2021. What is immersive journalism? In *Immersive Journalism as Storytelling: Ethics, Production and Design*. Edited by Turo Uskali, Astrid Gynnild, Sarah Jones and Esa Sirkkunen. Abingdon-on-Thames: Taylor & Francis.
- Hardee, Gary M., and Ryan P. McMahan. 2017. FIJI: A Framework for the Immersive Journalism Intersection. *Frontiers ICT* 4: 1–21. [CrossRef]
- Hernandez, Robert. 2018. Interview by María José Benítez. Online in-depth interview. May 25.
- Hernández, Roberto, Carlos Fernández, and Pilar Baptista. 2014. *Metodología de la investigación*, 5th ed. Ciudad de México: McGraw Hill.
- Jaunt. 2017. The Cinematic VR Field Guide. A Guide to Best Practices for Shooting 360°. Available online: <https://www.jauntvr.com/cdn/uploads/jaunt-vr-field-guide.pdf> (accessed on 14 January 2022).
- Jones, Sarah. 2017. Disrupting the narrative: Immersive journalism in virtual reality. *Journal of Media Practice* 18: 171–85. [CrossRef]

- Jones, Sarah, and Ruth Callaghan. 2016. Immersive journalism in media education. *Media Education Research Journal* 7: 96–106. Available online: <https://pureportal.coventry.ac.uk/en/publications/immersive-journalism-in-media-education-2> (accessed on 14 January 2022).
- Kent, Tom. 2015. An Ethical Reality Check for Virtual Reality Journalism. *Medium*. Available online: <https://medium.com/@tjrkent/an-ethical-reality-check-for-virtual-reality-journalism-8e5230673507> (accessed on 13 January 2022).
- Kitzinger, Jenny. 1999. The methodology of focus groups: The importance of interaction between research participants. In *Qualitative Research*. Edited by A. Bryman and R. G. Burgess. Newcastle upon Tyne: Sage.
- Kool, Hollis. 2016. The ethics of immersive journalism: A rhetorical analysis of news storytelling with virtual reality technology. *Intersect* 9: 1–11.
- Krueger, Richard A., and Mary Anne Casey. 2000. *Focus Groups: A Practical Guide for Applied Research*, 4th ed. Newcastle upon Tyne: Sage.
- López Hidalgo, Antonio, Inés Méndez Majuelos, and Francisco José Olivares-García. 2022. The decline of Immersive Journalism in Spain since 2018. *Revista Latina de Comunicación Social* 80: 15–27. [CrossRef]
- Madary, Michael, and Thomas K. Metzinger. 2016. Real virtuality: A code of ethical conduct: Recommendations for good scientific practice and the consumers of VR-technology. *Frontiers in Robotics and AI* 3: 3. [CrossRef]
- Marconi, Francesco, and Taylor Nakagawa. 2017. *Report: How Virtual Reality Will Impact Journalism*. New York: Associated Press.
- Martínez Rodríguez, Lourdes, and Susana Torrado. 2017. Reflexiones en torno al periodismo y la narrativa transmedia. In *Territorios Transmedia y Narrativas Audiovisuales*. Edited by Susana Torrado, Gabriel Ródenas and José Gabriel Ferreras. Barcelona: UOC, pp. 145–64.
- Matyushina, Kristina. 2022. Effects of a Video Tour, Interactive Map, and 360-Degree Virtual Tour on Engagement and Interest. Master's thesis, University of Twente, Enschede, The Netherlands.
- McGartland, Doris, Marla Berg, Susan Tebb, Suzanne E. Lee, and Shannon Rauch. 2003. Objectifying Content Validity: Conducting a Content Validity in Social Work Research. *Social Research* 27: 94–104.
- Milk, Chris. 2015. How Virtual Reality Can Create the Ultimate Empathy Machine. *TED Talks*. Available online: https://www.ted.com/talks/chris_milk_how_virtual_reality_can_create_the_ultimate_empathy_machine (accessed on 12 January 2022).
- Muntean, Reese, Kate Hennessy, Alexandra Denes, and Linina Phuttitarn. 2019. On Research Ethics and Representation in Virtual Reality. Paper presented at 2019 IEEE Conference on Virtual Reality and 3D User Interfaces (VR), Osaka, Japan, March 23–27; pp. 1493–96.
- Nash, Kate. 2018. Virtual reality witness: Exploring the ethics of mediated presence. *Studies in Documentary Film* 12: 119–31. [CrossRef]
- Nyumba, O. Tobias, Kerrie Wilson, Christina J. Derrick, and Nibedita Mukherjee. 2017. The use of focus group discussion methodology: Insights from two decades of application in conservation. *Methods in Ecology and Evolution* 9: 20–32. [CrossRef]
- Owen, Taylor, Fergus Pitt, Raney Aronson-Rath, and James Milward. 2015. *Virtual Reality Journalism*. New York: Tow Center for Digital Journalism, Available online: <https://cutt.ly/Sr5lrKL> (accessed on 14 January 2022).
- Pérez-Seijo, Sara. 2016. Origen y evolución del periodismo inmersivo en el panorama internacional. In *Actas del II Simposio de la Red Internacional de Investigación de Gestión de la Comunicación*. Quito: Universidad Técnica Particular de Loja, pp. 402–18.
- Pérez-Seijo, Sara. 2021. Uso del vídeo 360° por los medios nativos digitales. Análisis exploratorio de los primeros pasos en el ecosistema español. *El Profesional de la Información* 30: 3. [CrossRef]
- Pérez-Seijo, Sara, and Xosé López-García. 2019. Five Ethical Challenges of Immersive Journalism: A Proposal of Good Practices' Indicators. In *Information Technology and Systems. ICITS 2019 (954–964)*. *Advances in Intelligent Systems and Computing*. Edited by Á. Rocha, C. Ferrás and M. Paredes. Berlin/Heidelberg: Springer.
- Pirker, Johanna, and Andreas Dengel. 2021. The potential of 360-degree virtual reality videos and real VR for education—A literature review. *IEEE Computer Graphics and Applications* 41: 76–89. [CrossRef]
- Puchta, Claudia, and Jonathan Potter. 2004. *Focus Group Practice*. Newcastle upon Tyne: Sage.
- Riva, Giuseppe. 2020. Virtual reality in clinical psychology. *Reference Module in Neuroscience and Biobehavioral Psychology*. Available online: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7500920/> (accessed on 14 January 2022). [CrossRef]
- Robertson, Adi. 2017. At Tribeca's VR Showcase, Artists Are Trying to Move Beyond Empathy. *The Verge*. Available online: <https://www.theverge.com/2017/5/3/15524404/tribeca-film-festival-2017-vr-empathy-machine-backlash> (accessed on 14 January 2022).
- Sánchez Laws, Ana Luisa. 2019. *Conceptualising Immersive Journalism*. Abingdon-on-Thames: Routledge.
- Sánchez Laws, Ana Luisa. 2020. Can immersive journalism enhance empathy? *Digital Journalism* 8: 213–28. [CrossRef]
- Shadiev, Rustam, Liuxin Yang, and Yueh Min Huang. 2021. A review of research on 360-degree video and its applications to education. *Journal of Research on Technology in Education*, 1–16. [CrossRef]
- Shin, Donghee. 2018. Empathy and embodied experience in virtual environment: To what extent can virtual reality stimulate empathy and embodied experience? *Computers in Human Behavior* 78: 64–73. [CrossRef]
- Shin, Donghee, and Frank Biocca. 2017. Exploring immersive experience in journalism what makes people empathize with and embody immersive journalism? *New Media & Society* 19: 1–24. [CrossRef]
- Sidorenko, Pavel, Juan Ignacio Cantero-De-Julián, and José María Herranz-De-la-Casa. 2017. La realidad virtual y el formato multimedia en 360° como mecanismo de enriquecimiento de los contenidos periodísticos. In *Nuevas Tecnologías Audiovisuales para Nuevas Narrativas Interactivas Digitales en la era Multidispositivo*. Edited by J. Sierra. New York: McGraw Hill, pp. 99–108.

- Sirkkunen, Esa, and Turo Uskali. 2019. Virtual reality journalism. In *The International Encyclopedia of Journalism Studies*. Edited by T. P. Vos and F. Hanusch. New York: Wiley. [CrossRef]
- Sirkkunen, Esa, Heli Väättäjä, Turo Uskali, and Parisa Pour Rezaei. 2016. Journalism in virtual reality: Opportunities and future research challenges. In *Academic MindTrek'16: Proceedings of the 20th International Academic MindTrek Conference*. New York: Association for Computing Machinery, pp. 297–303.
- Skjong, Rolf, and Benedikte H. Wentworth. 2001. Expert judgment and risk perception. Paper presented at Eleventh International Offshore and Polar Engineering Conference, Stavanger, Norway, June 17–22. Available online: <http://research.dnv.com/skj/Papers/SkjWen.pdf> (accessed on 4 January 2022).
- Slater, Mel. 2009. Place illusion and plausibility can lead to realistic behaviour in immersive virtual environments. *Philosophical Transactions of the Royal Society B: Biological Sciences* 364: 3549–57. [CrossRef] [PubMed]
- Slater, Mel, Anthony Steed, and Martin Usoh. 2013. *Being There Together: Experiments on Presence in Virtual Environments (1990s)*. London: University College London.
- Suh, Ayoung, Guan Wang, Wenyang Gu, and Christian Wagner. 2018. Enhancing Audience Engagement Through Immersive 360-Degree Videos: An Experimental Study. Paper presented at International Conference on Augmented Cognition, Las Vegas, NV, USA, July 15–20; pp. 425–43.
- Sundar, Shyyam S., Jin Kang, and Danielle Oprean. 2017. Being there in the midst of the story: How immersive journalism affects our perceptions and cognitions. *Cyberpsychology, Behavior, and Social Networking* 20: 672–82. [CrossRef]
- The Emblematic. 2018. Creating Virtual Reality Journalism: A Guide for Best Practices. *Frontline*. Available online: <https://cutt.ly/Ar5kVFv> (accessed on 14 January 2022).
- Uskali, Turó, and Pasi Ikonen. 2021. The impact of emotions in immersive journalism. In *Immersive Journalism as Storytelling. Ethics, Production, and Design*. Edited by Turó Uskali, Astrid Gynnild, Sarah Jones and Sarah Esa Sirkkunen. Abingdon-on-Thames: Routledge, pp. 49–59. [CrossRef]
- Van Damme, Kristin, Anissa All, Lieven De Marez, and Sarah Van Leuven. 2019. 360° Video Journalism: Experimental Study on the Effect of Immersion on News Experience and Distant Suffering. *Journalism Studies* 20: 2053–76. [CrossRef]
- Verde, Ana, and José Manuel Valero. 2021. Virtual museums and Google arts & culture: Alternatives to the face-to-face visit to experience art. *International Journal of Education and Research* 9: 43–54. Available online: <https://www.ijern.com/journal/2021/February-2021/05.pdf> (accessed on 29 April 2022).
- Visch, Valentijn, Ed Tan, and Dylan Molenaar. 2010. The emotional and cognitive effect of immersion in film viewing. *Cognition & Emotion* 24: 1439–45.
- Watson, Zillah. 2017. VR for News: The New Reality? *Reuters Institute*. Available online: <https://reutersinstitute.politics.ox.ac.uk/our-research/vr-news-new-reality> (accessed on 14 January 2022).
- Wimmer, Roger, and Joseph Dominick. 1996. *La Investigación Científica de los Medios de Comunicación: Una Introducción a Sus Métodos*. Gerlingen: Bosch.
- Zuckerberg, Mark. 2014. I'm Excited to Announce that We've Agreed to Acquire Oculus VR, the Leader in Virtual Reality Technology. *Facebook*. Available online: <https://www.facebook.com/zuck/posts/10101319050523971> (accessed on 14 January 2022).