

Babeş-Bolyai University  
Faculty of Political, Administrative, and Communication Sciences  
Doctoral School of Communication, Public Relations, and Advertising

**Immersive Journalism and 360-degree Videos.  
An Experimental Approach and the Perspective of the Experts  
(Jurnalismul imersiv și materialele video filmate 360 de grade. O abordare  
experimentală și perspectiva experților)**

**Summary**

SCIENTIFIC COORDINATOR

Professor Delia Cristina Bălaș (Balaban), Ph.D.

PH.D. CANDIDATE

Christof Amrhein

CLUJ-NAPOCA

2022

## Table of Contents

<i>List of Figures</i> .....	3
<i>List of Tables</i> .....	5
<i>Introduction</i> .....	6
<i>Chapter 1. Virtual, Augmented, and Mixed Reality. Main Concepts and Metatheoretical Approaches</i> .....	14
1.1. The Development of VR Technologies from a Wider Perspective .....	14
1.2. VR Technologies and Their Applicability .....	20
1.3. The Journalistic Field in the Era of Digital Communication .....	26
1.4. Environmental Communication and Climate Change.....	30
1.5. Conclusions.....	30
<i>Chapter 2. VR, AR, and 360-degree Videos. A Theoretical Framework</i> .....	32
2.1. Technological Determinism. Media from Gutenberg Galaxies to Virtual Reality .....	32
2.2. The Social Construction of (Virtual) Reality .....	36
2.3. Defining VR, AR, and 360-degree Videos .....	39
2.4. Key Concepts for VR Environments: Immersion and Presence.....	43
2.4.1. Immersion .....	43
2.4.2. Presence.....	46
2.5. Media Reception in VR Environments. Theoretical Models .....	48
2.6. Conclusions .....	60
<i>Chapter 3. The Impact of VR Technologies on Journalism</i> .....	62
3.1. Immersive Journalism. Defining the Concept, Content, Producers, and Disseminators .....	62
3.2. Previous Research on the Effects of Immersive Journalism.....	64
3.3. Opportunities and Challenges of Immersive Journalism .....	72
3.4. Conclusions .....	74
<i>Chapter 4. Methods</i> .....	77
4.1. Objectives, Research Questions, and Hypotheses .....	77
4.2. Methods: Experiment and Interviews with Experts.....	79
4.2.1. The Experiment .....	79
4.2.2. Expert Interviews .....	81
4.3. Experiment Research Instruments .....	84
4.4. Conducting Interviews with the Experts on the Impact of 360-degree Videos .....	87

<b><i>Chapter 5. The Experiment. Results and Discussion</i></b> .....	<b>89</b>
<b>5.1. Design and Materials</b> .....	<b>90</b>
<b>5.2. Procedure</b> .....	<b>92</b>
<b>5.3. Participants</b> .....	<b>94</b>
<b>5.4. Measures</b> .....	<b>95</b>
<b>5.4.1. Dependent Variables</b> .....	<b>95</b>
<b>5.4.2. Covariates</b> .....	<b>95</b>
<b>5.5. Findings</b> .....	<b>97</b>
<b>5.5.1. Randomization Checks</b> .....	<b>97</b>
<b>5.5.2. Descriptive Statistics</b> .....	<b>98</b>
<b>5.5.3. Hypotheses Testing</b> .....	<b>101</b>
<b>5.6. The Analysis of Field of View Data</b> .....	<b>108</b>
<b>5.7. The Follow-up Survey</b> .....	<b>109</b>
<b>5.7. Discussion</b> .....	<b>112</b>
<b>5.8. Conclusions of the Experiment and the Follow-up Survey</b> .....	<b>113</b>
<b><i>Chapter 6. The Perspective of the Experts</i></b> .....	<b>116</b>
<b>6.1. The Applications and Relevance of VR Technologies</b> .....	<b>116</b>
<b>6.2. Elements that Distinguish Immersive Media from 2D Media</b> .....	<b>117</b>
<b>6.3. Spatial and Self-presence</b> .....	<b>118</b>
<b>6.4. Cognitive, Affective, and Behavioral Outcome of User Engagement with Immersive Media</b> .....	<b>119</b>
<b>6.5. Market Penetration</b> .....	<b>120</b>
<b>6.6. Future Perspectives</b> .....	<b>121</b>
<b>6.7. Conclusions of the Interviews with the Experts</b> .....	<b>122</b>
<b><i>Chapter 7. Conclusions, Limitations, and Future Research</i></b> .....	<b>123</b>
<b><i>Bibliography</i></b> .....	<b>128</b>
<b>Appendix</b> .....	<b>151</b>

**Key words:** immersive journalism, virtual reality, experiment, 360-degree video, media effect

Over the last decade, we have been witnessing a radical transformation in the way human beings communicate, and especially in the way journalistic narratives are produced. It is not only technology that has developed tremendously, but we have also witnessed profound transformations in the way people search for information and engage with it. Technology is an important part of the communication process; to paraphrase Marshall McLuhan, media is not only the message, but is in itself a choice that says a lot about the users. This thesis focuses on the phenomenon of communication through 360-degrees or immersive videos (IV). The technology of 360-degree videos is related to augmented reality (AR) and virtual reality (VR). Through devices that have become increasingly accessible to the public, this genre of 360-degree videos can be watched. There is a wide variety of such video production from different fields that are accessible to the public. Moreover, YouTube, the highly used video platform, and other producers and distributors of audio-video content such as the National Geographic Channel, have made available to the public a rich offer of 360-degree videos. Recently, Facebook changed its name to Meta and announced its interest in developing immersive content that would be connected to the initial core of its business, social networking. As the pressure upon and within the platform industry grows, the interest in VR, AR, and mixed reality grows along. The industry is working in two directions simultaneously: to make the hardware (such as VR headsets) easier to use and affordable on a large scale and to increase the offer on user-appealing content.

With the development of these new technologies, the research on how human beings interact with this type of audio-video media and their effects has become more and more relevant. Scholarship in the field of 360-degree videos, cinematic VR, and immersive journalism gained momentum within the last year. However, an in-depth understanding of the impact of user engagement with 360-degrees videos is needed. Considering both modality of media evolvement (desktop vs. head-mounted-display HMD) as well as storytelling elements (in particular directional agency) is **the research gap** that this thesis aims to address. Being aware of the substantial potential of exploration of immersive journalism (Reis & Coelho, 2018), **the main objective of the present research** is to explore the effects of users' engagement with 360-degrees or immersive videos, as well as that of experts. Furthermore, the present research aims to elaborate on how the feelings of immersion and presence are perceived, and whether these 360-degree videos have

cognitive (memory), affective (emotions), and behavioral effects (e.g., the user's story-sharing intention). The thesis looks at different types of narrative elements and how users focus on storytelling in immersive environments such as 360-degree videos. Having in mind the importance of climate change, the 360-degree videos analyzed focused on this topic, so the experimental procedure also integrated an intervention part that aimed to raise awareness of the topic.

The doctoral thesis starts with a presentation of the development of VR technologies from a historical perspective and beyond. There are several perspectives on the history of media: the history of innovation, of technology, as well as a history of technology use and institutional development. Humans have always been fascinated with technologies and therefore constant efforts to endeavor and innovate in the technological field accompanied the development of human society (Hassan, 2020). Even if there are references to virtual spaces in ancient philosophy (e.g., the Allegory of the Cave in Plato's work *The Republic*), the term virtual reality is influenced by the work of Ivan Sutherland and Jaron Lanier (Biocca, Lauria, & McCarthy, 1997; Blaga & Iancu, 2021; Bühl, 1997). Considered part of the post-digital or the meta-digital revolution (Reis & Coelho, 2018), VR technologies shifted within the last decades from cutting-edge technology to affordable products used on a large scale. The development of the computer technology that we referred to in the first chapter of the thesis made possible the event of data gloves and glasses, and head-mounted displays (HMDs) that are connected to applications on users' mobile phones. VR technologies enable isolation from the real world and immersion into computer-generated surroundings (Ambrosio & Fidalgo, 2019).

In the first chapter, applications of VR technologies in different fields are presented. Some of those fields are marketing and e-commerce (Kaplan & Hahenlein, 2009), education (Garzón, Pavón, & Baldiris, 2019; Page, 2015), advertising (Breves & Schramm, 2019; Choi & Taylor, 2014; Kim, 2021; Li, Daugherty, & Biocca, 2002; Martin, 2017; Van Kerrebroeck, Brengman, & Willems, 2017), PR (Breves, 2020), events (Xu, 2022), journalism (Gynnild et al., 2020; Hassan, 2020; Kang, 2020; Kang et al., 2018; Palmer, 2020; Sánchez Laws, 2017). The thesis aims to contribute to the discussion surrounding the transformation generated by the emergence of communication platforms, which is important in the general economics of the thesis given the existence of these platforms that make available 360-degree content. Besides, social media enabled the wide use of AR filters in the postings of different kinds, of pictures and videos (Naderer, Peter, & Karsay, 2021).

As the present research seeks to shed light on immersive journalism, after talking about VR or immersive technologies, discussing current developments in journalism is part of the rationale of the present thesis. The relevance of environmental communication in the context of climate change is a topic addressed in the first chapter of the thesis as well.

The meta-theoretical foundation, the general framework is presented as the starting point of the second chapter. Technological determinism and constructivism represent the two paradigms on which the thesis is built. The first paradigm highlighted the importance of technology. The famous idea that *the medium is the message* must be reinterpreted in the new VR technological settings, as “distances are annulled by technological evolution” (Correia Gil, 2014, p. 462). Moreover, Lee (2004) highlighted the relevance of McLuhan’s theory for the experiences of the VR environments in the context of the development of the so-called “wearable computers” such as headsets, data glasses, and data gloves „as the coupling of media to our sensory systems becomes more pervasive” (p. 35). In line with the constructivist approach, there is no such thing as objective reality, reality is socially constructed by the (virtual) media. The present approach relies upon both the constructivist perspective and technological determinism because it is researching an experience of interaction with 360-degree experience that can only be subjective as soon as we measure the experience of using it, the degrees of visual freedom, and presence.

In the second theoretical chapter, the two key concepts for the reception process in VR media – *immersion* and *presence* – are extensively discussed. The experience of immersion is not necessarily media related. However, in the present work, we look at immersion from the perspective of an experience of media reception, thus referring to what Slater (1999) called *media immersion*. Media immersion will be henceforth simply called *immersion*. As an individual experience, immersion is particularly influenced by isolation from reality, self-perception in virtual reality, interaction possibilities, and possibilities of motion control (Witmer & Singer, 1997). Immersion is one of the core characteristics of VR media that distinguish VR videos from other human-machine interfaces (Dörner et al., 2019; Steuer, 1992). Immersion was also associated with the concept of media vividness and interactivity (Lombard & Ditton, 1997). For Hofer (2016), immersion describes the information conveyed by the respective medium and presence experience as an inner-psychic experience. Presence is related to immersion, and it is “related to a sense of being in place” (Slater & Wilbur, 1997, p. 1). Slater and Wilbur (1997) defined presence as a

subjective feeling, a potential cognitive reaction to immersive stimuli. Lee (2004) distinguished three types of presence: spatial, social, and self-presence.

In this second chapter, relevant models of VR media reception and immersive journalism are presented in brief. First, Ambrosio and Fidalgo's (2019) communication model is beyond the distinction of linear models, and is described for both unique and multiple users. Furthermore, the Two-Level Model for the Emergence of Spatial Presence (Hartmann et al., 2005; 2015; Wirth et al., 2007) is explained concerning the factors related to media and users that contribute to media reception in VR environments. Next, the Modality-Interactivity-Agency-Navigability (Sundar, 2008) is introduced. The model posited that the experience of presence, realism, and vividness can trigger positive heuristics and therefore the media source and content are perceived as being more credible. Users' intuition to interact with a medium enables presence, and the sense of being transported in the media environment (Sundar, 2008; Sundar et al., 2017). The chapter ends with De Bruin et al. (2020) proposing a comprehensive model of immersive journalism.

The third chapter is dedicated to immersive journalism. A critical literature review is developed in this chapter. A starting point is De la Peña et al.'s (2010) definition of immersive journalism. Furthermore, relevant immersive journalistic productions, as well as media actors involved in the production and distribution of these new journalistic pieces such as *The New York Times*, *The Guardian*, *The Washington Post*, *The Wall Street Journal*, *ABC*, *ARTE*, *BBC Earth*, *CNN*, *National Geographic Channel*, *Süddeutsche Zeitung* *USA Today* are named. De Bruin et al. (2020) identified and analyzed the content of 189 immersive journalistic productions originating in several countries worldwide (from the Western world, but also the Global South) authored by national public broadcasters, national newspapers, commercial broadcasters, and production companies. Culture, environment/sustainability, war/defense, criminality, health, immigration, politics, and sports were the salient topics of the immersive journalistic content De Bruin et al. (2020) analyzed. The research state art of immersive journalism encompasses a variety of studies applying different methods such as content analysis (De Bruin et al., 2020), group discussions (Jones, 2017); experiments (Barreda-Ángeles, Aleix-Guillaume, & Pereda-Baños, 2021; Breves & Heber, 2019; Hendriks Vettehen et al., 2019; Makowski et al., 2017; Pjesivac et al., 2020; Shin & Biocca, 2017), interviews with experts (Lopezosa et al., 2021), analysis of case studies (Sánchez Laws, 2017), critical discourse analysis (Hassan, 2020).

With few exceptions, previous studies highlighted that immersive media use generates high levels of presence that can subsequently result in various affective and behavioral outcomes, such as enjoyment, subjective involvement, and engagement with distance suffering (Barreda-Ángeles, Aleix-Guillaume, & Pereda-Baños, 2021; Breves & Heber, 2019; Van Damme et al., 2019). One predicted outcome of immersive journalism is empathy, as 360-degree videos are referred to as “empathy machines” (Bollmer, 2017). Sánchez Laws (2017) is in favor of this idea and gave some relevant examples to support it. Finally, immersive media use has an impact on different psychological aspects (Breves & Heber, 2019; Higuera-Trujillo et al., 2017; Schroth, Angel, Sheppard, & Dulic, 2014), on information processing, and message credibility. No significant effects were found for narrative transportation and attitudes toward the news (Pjesivac et al., 2021). Message credibility was perceived as higher in immersive media settings under the mediation of strong feelings of presence (Kang et al., 2018; Sundar et al., 2017). Having in mind the ethical implications of immersive journalism (Hassan, 2020; Palmer, 2020; Sánchez Laws, 2017) in the final part of the third chapter, a critical reflection on the impact of immersive journalism on the journalistic field is delivered.

Previous research was furthermore considered for the development of the conceptual framework and subsequently positing of hypotheses and addressing research questions that were tested through employing the methodological design.

The present work contains a following chapter dedicated to an **overview of the methodology**. The research questions of the thesis are:

**RQ1. What are the cognitive, affective, and behavioral effects of users’ engagement with 360-degrees videos?**

**RQ2. What are the prospects for the future development of 360-degrees videos, especially for journalism and cinematic storytelling?**

This chapter presents the two methods applied, a laboratory experiment and interviews with experts, together with the research objectives, research questions, and hypotheses models. The methodology is based on prior research that highlighted the role of the experimental approach in analyzing communication effects. Data was collected in two waves. The first point in time of data collection took place after the media reception, and the second four weeks later. During media reception, field of view data were also collected, so that linkage analysis was possible. Aiming to shed light on the applicability of 360-degree videos and the future of this type of communication,



the perspective of the experts working in the field was highly needed. The author took the opportunity to discuss the findings of the experiment with experts during interviews that were conducted in July-August 2022. Overall, by applying this mixed-methodology that included both quantitative (experiment) and qualitative (interviews with experts) approaches, the present study presents 360-degree videos from a comprehensive perspective.

The most relevant part of the empirical contribution of the present thesis, namely the experiment, is presented in chapter five. It contains the methodological design, procedure, and participants, as well as the measured variables, the statistical analysis, results, and discussions. Brief conclusions, the limits of this approach, as well as the future research perspectives, the most important contribution of the thesis is the 2 (desktop vs. HMD) x 2 (low vs. high complexity of the storytelling in terms of directional agency) factorial experiment carried out. The following hypotheses and research questions were tested with the help of the experiment:

**H1. HDM reception will have a greater impact on special presence than desktop reception.**

**H2. HDM reception will have a greater impact on self-presence than desktop reception.**

**H3. HDM users will report having a greater degree of visual freedom than desktop users.**

**H4. HDM users will often recommended the video than desktop users.**

**H5. Additional storytelling elements (directional agency) will have a moderating role on HMD reception impact on the perception of a) spatial presence, b) self-presence, c) visual degree of freedom, and d) users' recommendation.**

**RQ3. What role do users' factors such as familiarity with VR technology, prior use of VR technology, experience with gaming, and motion sickness play in the 360-degree videos experience?**

**RQ4. What impact do 360-degree videos have on memory?**

**RQ5. What storytelling elements in term of directional agency draw the attention of media users?**

As already mentioned, the two videos aim to draw attention to climate change. The initial between-subjects design was followed by an additional survey applied four weeks after the experiment, that enabled a longitudinal perspective on media effects. In brief, the main takeaways of the experiment were that the participants randomly assigned to the experimental groups in which

they used HDM have longer memory of the content watched and tend to reflect more on the topics presented in the videos.

In addition to the experiment, several interviews with experts working in Austria and Germany were conducted. The experts working in higher education institutions or in private companies involved in the development of VR technologies that were interviewed ( $N=9$ ) elaborate on the two main research questions listed earlier.

In the development process of the thesis, the author faced two major challenges. The first one is endogenous and the second one exogenous. As a researcher involved in teaching students how to film and post-produce 360-degree videos, writing in a concise manner about technical aspects of immersive journalism was for sure the greatest challenge. Therefore, the author had to restrain in presenting many technical details of how VR technologies are applied in the journalistic context. The present thesis deals with human-computer interaction, a topic that lies at the core preoccupations of communication science. So, the focus of the research lies in the observation of the reception process and the impact of 360-degree videos. Therefore, this is a work in the field of communication sciences. However, interdisciplinarity found its way through, as media psychological approaches and visual arts perspectives had to be included. The second challenge was the COVID-19 pandemic, which changed the authors' plan to conduct the empirical research from March 2020 until April 2022. Besides, in the context of physical distancing and limited traveling, initial plans to use stimulus materials for the laboratory experiment's video production had to be dropped, so that immersive journalism productions from well-established actors in the field such as *National Geographic Channel* were used.

The sixth chapter is dedicated to the presentation and the interpretation of the results of the expert interviews. Thematical analysis was applied. As the experiment addressed the micro level of the impact of immersive journalism, the views of the experts unveiled the macro perspective when talking about the relevance, implications, applicability, diffusion of innovation, and future of cinematic VR and immersive journalism.

Several conclusions can be drawn from this doctoral thesis. First, the systematic literature review presented in the first three chapters showed robust scholarship focusing on VR and immersive media. The thesis encompasses a historical perspective on the development of VR technologies and the implications of these developments. Relevant concepts for the rationale of the doctoral thesis such as virtual, augmented, and mixed reality as well as immersive journalism

were introduced. Furthermore, the thesis continued with a critical reflection on the challenges that the field of journalism faced over the last decade, as the central concept-immersive journalism-consists of two words, immersive and journalism. The systematic literature review covered several theoretical models that contribute to the understanding of how immersive media works and what the factors that play an important role in the media reception processes are. Ambrosio and Fidalgo (2019) stressed that to understand immersive or VR media the logic of the simple linear communication models (e.g., Lasswell, 1948) must be left behind. In VR media settings, the distinction between message and receiver no longer applies, and feedback is delivered in real-time as the reception is influenced by eye or/and body movements.

Hartmann et al. (2005; 2015) and Wirth et al. (2007) developed a model that describes media reception processes in VR settings by highlighting the role of experiencing the presence and the media and human factors that influence this experience. We considered these factors in the experimental design and found out that prior VR knowledge and previous experience, as well as a gaming experience, did not affect the experience of presence generated by viewing 360-degree videos with HMD. However, motion sickness and fear-of-missing-out feelings were reported by the participants. As an outcome of the critical literature review on the topic, the author made a list of the potential influencing factors that must be considered when looking at the media reception process in immersive media. The author reflected on the technical media factors, as well as content media factors, when developing the experimental procedures and the surveys. The degree of immersion, first- or third-person perspective, quality of the display and information, technical interaction possibilities, the realism of the story, meaningful media representations, strong narrative, and narrative consistency were thoughtfully considered when designing the methodological instruments. Moreover, some of the user factors identified in previous studies, such as spatial imagination, attention focus, involvement, suppression of beliefs, motion sickness or cybersickness, stereopsis, and emotional experience were measured and controlled for in the analysis of the data generated by the experiment and the follow-up survey.

De Bruin et. al. (2020) delivered a comprehensive approach to immersive journalism that covers several aspects involved not only in the reception of the immersive media content, also accounting for possible disturbing factors, but also in the production and distribution of immersive journalism. Environmental-related topics are on a short list of the topics immersive media producers preferred. Having in mind the importance of this topic in the light of climate change,

the content of the 360-degree videos that we analyzed focused on environmental experiences and were nature footage, as they depicted a polar environment and a reservation.

The present research aimed to shed light on immersive journalism and therefore special attention was given to previous research focusing on the outcomes of immersive journalism. There are several perspectives on immersive journalism a concept introduced by De la Peña et al. (2010). Among other VR applications, this is quite a new family member and therefore still reflecting Roger's (1965) diffusion of innovation model like Pavlik and Bridges (2013) did, a decade after, is relevant in the author's view based on the educated opinion of the experts that were interviewed.

The central role of the experience of presence in differentiating the reception processes in immersive media from desktop is unanimously acknowledged in the literature that was analyzed, as well as by the experts that were interviewed. Moreover, the experimental findings are in favor of this idea. Empirical evidence was found to support that modality has an impact on the experience of spatial and self-presence. Previous literature suggested that immersive journalistic productions and 360-degree videos viewed with HMD contribute to enhancing memory (Kisker, Gruber, & Schöne, 2019; Makowski et al., 2017), generate strong emotional bonds, and change behavior (Breves & Heber, 2019; Higuera-Trujillo et al., 2017; Schroth et al., 2014). Based on the results of the experiment and the follow-up survey, we can roll several conclusions that are also answers to the research questions. We posited that immersive media modality enhances spatial and self-presence. We observed a positive role of modality not only after the media reception, as participants reported in the first survey, but also in the follow-up survey. The feeling of presence is well remembered four weeks after the engagement with 360-degree videos with the use of HMD. This knowledge is important and adds to the existing scholarship on media reception processes in immersive settings.

The experience of engaging with 360-degree videos with the use of HMD resembles reality. The participants' descriptions support this idea. Moreover, as previous literature suggested, engaging with immersive media triggers a lot of emotional responses (Hendriks Vettehen et al., 2019). Memory is enhanced by emotions. People remember situations better when these arouse good or bad emotions. Accompanied by emotions, memory scores of the 360-degree media content followed with HMD were high four weeks after media exposure. The present study unveiled that modality contributes to high scores in the intention to share the media content. This is relevant considering the increasing role of recommendation and the media affordances that allow sharing.

Let us imagine that in the future, as Meta is focusing on, social media will have a strong immersive media component.

Complex storytelling, a highly appreciated guidance of the narrator, high levels of directional agency (Korte, 2004) as well as the presence of polar animals in the Polar Obsession 360-video determined participants that follow the video with HMD to reflect on the preservation of nature. In this sense, the findings of the experiment and the follow-up survey are in favor of the idea that 360-degree videos with environmental content, such as nature footage, are effective in drawing attention and raising awareness on climate change. Luckily, as De Bruin et al. (2020) stressed, the topic of environment is well ranked in the hierarchy of preferred topics for immersive journalistic content at this date. Determining whether people reflect on a topic such as the preservation of nature can contribute to the further development of pro-environmental attitudes and behavior. The present study is therefore in line with previous research on the impact of 360-degree videos on environmental communication (Breves & Heber, 2019).

The present study also adds to the existing scholarship from the methodological perspective; the experiment not only generated self-reported data through the survey, but also field of view data. The results of the linkage analysis enabled a comprehensive perspective of the reception process by focusing on the elements of storytelling such as directional agency that increased interactivity that draw the attention of the participants. Therefore, the experimental study and the follow-up survey shed light on the media reception of 360-degree videos from both the content perspective, as the environmental topic was the subject of the videos, as well as the narrative perspective. Overall, the study has a strong original component.

The view of the experts was covered by in-depth interviews conducted after the evaluation of the experimental data, so that a discussion based on the results of the present empirical study was possible. The experience of spatial and self-presence, triggering emotions because of the use of cinematic VR media were highlighted by experts as well. The market penetration and the patterns of consumption of immersive journalism as well as the 360-degree documentaries were the focus of the experts coming from higher education and the industry. Future perspectives in the development of VR technology, as well as implementing immersive journalism and cinematic VR on a large scale were also discussed. Overall, the expert's perspective is an optimistic one.

The first chapter of this doctoral thesis accommodated a critical literature review on the challenges the journalistic field is currently facing, being affected by several crises such as

shortages in economic resources in a highly competitive environment, fragmentation and polarization of audiences, and mistrust in the news media generated by the proliferation of disinformation in the era of post-truth. The journalistic profession has changed as well as the patterns of media reception in a society where the attention of audiences is a commodity. It is time now to close the circle and after analyzing empirical data generated with the help of an experiment and additional survey, after interviewing the experts, a final reflection on the role of immersive journalism in the context of the ongoing changing of the journalistic field is needed. Immersive journalism is part of the emotional turn (Lecheler, 2020; Wahl-Jorgensen, 2019). The affective outcomes of the user's engagement with VR media that the present study showed are a confirmation of this idea. Even though we did not look at empathy as a dependent variable in our studies, emotions, as well as high levels of spatial and self-presence that we observed, entitle us to stress that this emotional turn is a positive outcome of the immersive journalistic. Humans have always been fascinated by good stories. What has changed is the modality and the way media tells our stories. The immersive quality of the story, as well as the narrative techniques that capture the attention of the public, are strengths of immersive journalism. Therefore, immersive journalism can be a solution for counterbalancing the fragmented patterns of media usage established by social media such as focusing on a second screen. However, VR technologies must be available and affordable and the production of the immersive journalistic content, as well as the distribution, should not be just a niche.

The high levels of presence and the feelings that the user is experiencing a real world outside of the real world is also a challenge in the context of the development of deepfakes. Disinformation is a major challenge that the journalistic field is facing in this so-called crisis of credibility. Therefore, when working with immersive journalistic content and cinematic VR, producers and developers need to be committed to democratic values and embrace an ethical perspective. In this regard, the present dissertation supports the idea expressed by Sanchez Law (2017) that immersive journalism should be empathetic and ethical. Also, privacy should be considered as the expert stressed that the use of VR technology is related to sensitive data in the sense that each user generates data that make him or her unique and therefore easy to be identified.

The experimental findings have several **implications**. First, the theoretical implications consist of adding to the existing literature on the role of both media and user-related factors that influence the experience of engaging with immersive media as well as on the cognitive, affective,

and behavioral outcomes of this engagement. Second, there are also implications for practitioners such as producers of 360-degree videos, journalists, and environmental activists. Immersive media can serve the purpose of aiming to awaken or reinforce the environmental consciousness of the media users. Furthermore, this results in pro-environmental attitudes and behaviors.

There are the methodological limitations that were already stressed in the chapter dedicated to the experiment such as 1) the convenience sample, 2) the use of already existing stimulus materials because of the COVID-19 pandemic context that did not allow us to produce video material to be tested, and 3) the single item questions that were used for the measurement of dependent variables. The author must admit that this study also reflects the current development and implementations of the VR technology. Probably a future moment in time will draw a different picture of the experience of engagement with 360-degree videos. Media research is an ongoing process, a reflection of both the changing media technology, as well as the changing of patterns of the receptions. As immersive journalism matures, so will the user engagement change.

**Future perspectives** on the research of immersive journalism and 360-videos should consider methodological diversity. As VR technologies evolve, the research must continue. The researchers' attention should focus on the actors involved in immersive media productions, the content of immersive media production, as well users' perspectives of the experience with 360-degree videos.

## **Bibliography**

- Abidin, C. (2016). “Aren’t These Just Young, Rich Women Doing Vain Things Online?”: Influencer Selfies as Subversive Frivolity. *Social Media + Society*, 2(2), 1-17. DOI: 10.1177/2056305116641342
- Adolf, M. T. (2017). Öffentliche Kommunikation und kommunikative Öffentlichkeiten. Zur Konstitution von Öffentlichkeit im Zeitalter der digitalen Medien. In O. Hahn, R. Hohlfeld, & T. Knieper (Eds.), *Digitale Öffentlichkeit(en)* (pp. 51-64). Herbert von Halem Verlag.
- Ahn, S. J. G. (2014). Incorporating immersive virtual environments in health promotion campaigns: a construal level theory approach. *Health Communication*, 30(6), 545–556. <https://doi.org/10.1080/10410236.2013.869650>
- Ahn, S. J. G., & Bailenson, J. (2011). Self-endorsing versus other-endorsing in virtual environments. *Journal of Advertising*, 40(2), 93–106. <https://doi.org/10.2753/JOA0091-3367400207>
- Ahn, S. J. G., Bailenson, J., & Park, D. (2014). Short- and long-term effects of embodied experiences in immersive virtual environments on environmental locus of control and behavior. *Computers in Human Behavior*, 39, 235–245. <https://doi.org/10.1016/j.chb.2014.07.025>
- Ahn, S. J. G., Bostick, J., Ogle, E., Nowak, K. L., McGillicuddy, K. T., & Bailenson, J. N. (2016). Experiencing nature: embodying animals in immersive virtual environments increases inclusion of nature in self and involvement with nature. *Journal of Computer-Mediated Communication*, 21(6), 399–419. <https://doi.org/10.1111/jcc4.12173>
- Ahn, S. J. G., Le, A. M. T., & Bailenson, J. N. (2013). The effect of embodied experiences on self-other merging, attitude, and helping behavior. *Media Psychology*, 16(1), 7–38. 10.1080/15213269.2012.755877
- Aitamurto, T. (2018). Normative paradoxes in 360° journalism: Contested accuracy and objectivity. *New Media & Society*, 21(1), 3–19. <https://doi.org/10.1177/1461444818785153>
- Akreml, L. (2019). Stichprobenbeziehung in der qualitativen Sozialforschung. In N. Baur & J. Blasius (Eds.), *Handbuch Methoden der empirischen Sozialforschung* (pp. 313-331). Springer VS.



- Alhabash, S., & Ma, M. (2017). A tale of four platforms: Motivations and uses of Facebook, Twitter, Instagram, and Snapchat among college students?. *Social Media+ Society*, 3(1), <https://doi.org/10.1177/2056305117691544>
- Ambrosio, A. P., & Fidalgo, I. R. (2019). Proposal for a new communicative model in immersive journalism. *Journalism*, 1-18. <https://doi.org/10.1177/1464884919869710>
- American Psychological Association. (2020). Experience. *APA Dictionary of Psychology*. <https://dictionary.apa.org/experience>
- Anderson, A. A., Brossard, D., Scheufele, D. A., Xenos, M. A., & Ladwig, P. (2014). The “nasty effect:” Online incivility and risk perceptions of emerging technologies. *Journal of computer-mediated communication*, 19(3), 373-387. <https://doi.org/10.1111/jcc4.12009>
- Bailenson, J. N., Yee, N., Blascovich, J., Beall, A. C., Lundblad, N., & Jin, M. (2008) The Use of Immersive Virtual Reality in the Learning Sciences: Digital Transformations of Teachers, Students, and Social Context. *Journal of the Learning Sciences*, 17(1), 102-141. DOI: 10.1080/10508400701793141
- Balaban, D. C. (2009). *Medienkommunikation*. Hochschulverlag.
- Balaban, D. C., & Mustătea, M. (2019). Users’ Perspective on the Credibility of Social Media Influencers in Romania and Germany. *Romanian Journal of Communication and Public Relations*, 21(1), 31–46. <https://doi.org/10.21018/rjcpr.2019.1.269>
- Balaban, D. C., Mucundoreanu, M., & Naderer, B. (2021). The Role of Trustworthiness in Social Media Influencer Advertising: Investigating Users’ Appreciation of Advertising Transparency and Its Effects. *Communications*. <https://doi.org/10.1515/commun-2020-0053>
- Barreda-Ángeles, M., Aleix-Guillaume, S., & Pereda-Baños, A. (2021). Virtual reality storytelling as a double-edged sword: Immersive presentation of nonfiction 360°-video is associated with impaired cognitive information processing. *Communication Monographs*, 88(2), 154-173. DOI: 10.1080/03637751.2020.1803496
- Bateson, G. (1972). *Steps to an Ecology of Mind: Collected Essays in Anthropology, Psychiatry,*
- Beck, K. (2013). *Kommunikationswissenschaft*, 3rd edition. UVK.
- Bentele, G., Brosius, H. B., & Jarren, O. (Eds.). (2013). *Öffentliche Kommunikation: Handbuch Kommunikations-und Medienwissenschaft*. Springer-Verlag.

- Berntsen, K., Palacios, R. C., Herranz, E., & Link, S. (2016). Virtual Reality and its uses - a systematic literature review. *TEEM '16: Proceedings of the Fourth International Conference on Technological Ecosystems for Enhancing Multiculturality*, 435-439. <https://doi.org/10.1145/3012430.3012553>
- Bimber, O., & Raskar, R. (2005). *Spatial augmented reality*. Ak Peters/ CRC Press.
- Biocca, F., Burgoon, J., Harms, C., & Stoner, M. (2001). Criteria and scope conditions for a theory and measure of social presence. *Media Interface & Network Design Lab*.
- Biocca, F., Lauria, R., & McCarthy, M. (1997). Virtual Reality. In Grant, A. (Ed.), *Communication Technology Update*, 6<sup>th</sup> edition (pp. 176-195). Focal Press.
- Blaga, P., & Iancu, I. (2021). Applications of Virtual Reality in Communication. A Top-Journals Theoretical Overview. *Styles of Communication*, 13(1), 9-42. DOI: 10.31178/SC.13.1.01
- Boczkowski, P. J. (2004). The processes of adopting multimedia and interactivity in three online newsrooms. *Journal of communication*, 54(2), 197-213. DOI: 10.1111/j.1460-2466.2004.tb02624.x
- Boczkowski, P. J., Mitchelstein, E., & Matassi, M. (2018). “News comes across when I’m in a moment of leisure”: Understanding the practices of incidental news consumption on social media. *New Media & Society*. <https://doi.org/10.1177/1461444817750396>
- Bollmer, G. (2017). Empathy Machines. *Media International Australia*, 165(1), 63–76. <https://doi.org/10.1177/1329878X17726794>
- Bonfadelli, H. (2004). *Medienwirkungsforschung 1. Grundlagen und theoretische Perspektiven*. UVK Verlag München.
- Boyd, D. E., & Koles, B. (2019). An introduction to the special issue “virtual reality in marketing”: definition, theory and practice. *Journal of Business Research*, 100, 441-444. <https://doi.org/10.1016/j.jbusres.2019.04.023>
- Brailas, A. (2021). Digital storytelling and the narrative turn in psychology: Creating spaces for collective empowerment. *Global Journal of Community Psychology Practice*, 12(4), 1-19. DOI: 10.31234/osf.io/vx2up
- Breves, P. (2020). Bringing People Closer: The Prosocial Effects of Immersive Media on Users’ Attitudes and Behavior. *Nonprofit and Voluntary Sector Quarterly*, 49(5). <https://doi.org/10.1177/0899764020903101>

- Breves, P. L., Liebers, N., Abt, M., & Kunze, A. (2019). The perceived fit between Instagram influencers and the endorsed brand: How influencer-brand fit affects source credibility and persuasive effectiveness. *Journal of Advertising Research*, 59(4), 440–454. DOI: 10.2501/JAR-2019-030
- Breves, P., & Heber, V. (2019). Into the wild: The effects of 360° immersive nature videos on feelings of commitment to the environment. *Environmental Communication*, 14(3), 332–346. <https://doi.org/10.1080/17524032.2019.1665566>
- Breves, P., & Schramm, H. (2019). Good for the feelings, bad for the memory: The impact of 3D versus 2D movies on persuasion knowledge and brand placement effectiveness. *International Journal of Advertising*, 38(8), 1264–1285. DOI: 10.1080/02650487.2019.1622326
- Brockhaus (1972). Medien. *Brockhaus Enzyklopädie*. Brockhaus Verlag.
- Brockhaus (2022). Medien. *Brockhaus Enzyklopädie*. <https://brockhaus.de/ecs/julex/article/medien>
- Broll, W. (2019). Augmentierte Realität. In R. Dörner, W. Broll, & P. Grimm (Eds.), *Virtual und Augmented Reality (VR/AR): Grundlagen und Methoden der Virtuellen und Augmentierten Realität* (pp. 315-356). Springer Verlag Berlin.
- Brosius, H.-B., Koschel, F., & Haas, A. (2016). *Methoden der empirischen Kommunikationsforschung. Eine Einführung*, 7th edition. Springer VS.
- Brüggemann, M., & Engesser, S. (2017). Skeptiker müssen draußen bleiben: Weblogs und Klimajournalismus. In O. Hahn, R. Hohlfeld, & T. Knieper (Eds.), *Digitale Öffentlichkeit(en)* (pp. 165-182). Herbert von Halem Verlag.
- Bühl, A. (1997). *Die virtuelle Gesellschaft. Ökonomie, Kultur und Politik im Zeichen des Cyberspace*. Westdeutscher Verlag.
- Bühl, A. (2000). *Die virtuelle Gesellschaft des 21. Jahrhunderts. Sozialer Wandel im digitalen Zeitalter*. Westdeutscher Verlag.
- Campbell, C., & Farrell, J. R. (2020). More than meets the eye: The functional components underlying influencer marketing. *Business Horizons*, 63(4), 469–479. <https://doi.org/10.1016/j.bushor.2020.03.003>

- Campbell, C., & Grimm, P. E. (2019). The Challenges Native Advertising Poses: Exploring Potential Federal Trade Commission Responses and Identifying Research Needs. *Journal of Public Policy and Marketing*, 38(1), 110–123. DOI: 10.1177/0743915618818576
- Castells, M. (2007). Communication, power and counter-power in the network society. *International Journal of Communication*, 1, 238-266. <https://ijoc.org/index.php/ijoc/article/view/46/35>
- Castells, M. (2009). *Communication Power*. Oxford University Press.
- Castells, M. (2010). *The Information Age: Economy Society and Culture. Vol. I: The Rise of the Network Society*. Blackwell.
- Caswell, D. (2019). Structured journalism and the semantic units of news. *Digital Journalism*, 7(8), 1134–1156. DOI: 10.1080/21670811.2019.1651665
- Caswell, D., & Dörr, K. (2018). Automated journalism 2.0: Event-driven narratives. *Journalism Practice*, 12(4), 477–496. DOI: 10.1080/17512786.2017.1320773
- Chadwick, A. (2017). *The hybrid media system: Politics and power*. Oxford University Press.
- Chen, Y. (2016). The Effects of Virtual Reality Learning Environment on Student Cognitive and Linguistic Development. *Asia-Pacific Education Researcher*, 25(4), 637-646. <http://dx.doi.org/10.1007/s40299-016-0293-2>
- Choi, Y. K., & Taylor, C. R. (2014). How do 3-dimensional images promote products on the Internet?. *Journal of Business Research*, 67, 2164-2170. <https://doi.org/10.1016/j.jbusres.2014.04.026>
- Coelho, C., Tichon, J. G., Hine, T. J., Wallis, G. M., & Riva, G. (2006). Media presence and inner presence: The sense of presence in virtual reality technologies. In G. Riva, M. T. Anguera, B. K. Wiederhold, & F. Mantovani (Eds.), *From communication to presence: Cognition, emotions and culture towards the ultimate communicative experience* (pp. 25–45). IOS Press.
- Colombo, D., Díaz-García, A., Fernandez-Álvarez, J., & Botella, C. (2021). Virtual reality for the enhancement of emotion regulation. *Clinical Psychology*, 28(3), 519-537. DOI: 10.1002/cpp.2618
- Cormode, G., & Krishnamurthy, B. (2008). Key differences between Web 1.0 and Web 2.0. *First Monday*, 13(6). <https://doi.org/10.5210/fm.v13i6.2125>

- Correia Gill, A. C. (2014). Globalization and Cultural Identities. A Contradiction in Terms. In R. S. Fortner, & Fackler, P. M. (Eds.), *The Handbook of Media and Mass Communication Theory* (pp. 462-479). John Willey and Sons, Inc.
- Cummings, J. J., & Bailenson, J. N. (2016). How immersive is enough? A meta-analysis of the effect of immersive technology on user presence. *Media Psychology*, 19(2), 272–309. DOI: 10.1080/15213269.2015.1015740
- Curtis, R. (2008). Immersion und Einfühlung. Zwischen Repräsentationalität und Materialität bewegter Bilder. *Montage/av. Zeitschrift für Theorie Und Geschichte Audiovisueller Kommunikation*, 17(2), 89–107. <https://doi.org/10.25969/mediarep/465>
- De Bruin, K., de Haan, Y., Kruikemeier, S., Lecheler, S., & Goutier, N. (2020). A first-person promise? A content-analysis of immersive journalistic productions. *Journalism*, 1-20. <https://doi.org/10.1177/1464884920922006>
- De Gauquier, L., Brengman, M., Willems, K., & Van Kerrebroeck, H. (2019). Leveraging advertising to a higher dimension: experimental research on the impact of virtual reality on brand personality impressions. *Virtual Reality*, 23, 235–253. <https://doi.org/10.1007/s10055-018-0344-5>
- De Kerckhove, D., & Lumsden, C. (1998). *The Alphabet and the Brain: The Lateralization of Writing*. Springer Verlag.
- De la Peña, N., Weil P., Llobera, J., Giannopoulos, E., Pomés, A., Spanlang, B., Friedman, D., Sanchez-Vives, M. V., & Slater, M. (2010). Immersive Journalism: Immersive Virtual Reality for the First-Person Experience of News. *Presence: Teleoperators and Virtual Environments*, 19(4): 291–301. DOI: [https://doi.org/10.1162/PRES\\_a\\_00005](https://doi.org/10.1162/PRES_a_00005)
- De Veirman, M., Cauberghe, V., & Hudders, L. (2017). Marketing through Instagram influencers: The impact of number of followers and product divergence on brand attitude. *International Journal of Advertising*, 36(5), 798–828. DOI: 10.1080/02650487.2017.1348035
- Derby, J. (2016). Virtual realities: The use of violent video games in U.S. military recruitment and treatment of mental disability caused. *Disability Studies Quarterly*, 36(1), 1-13. DOI: 10.18061/dsq.v36i1.4704
- Dhanesh, G. S., & Duthler, G. (2019). Relationship management through social media influencers: Effects of followers' awareness of paid endorsement. *Public Relations Review*, 45(3), 101765. <https://doi.org/10.1016/j.pubrev.2019.03.002>

- Dörner, A, Broll, W., & Jung, B. (2019). Einführung in Virtual und Augmented Reality. In A Dörner, W. Broll, & B. Jung (Eds.), *Virtual und Augmented Reality (VR/AR): Grundlagen und Methoden der Virtuellen und Augmentierten Realität* (pp. 1-42). Springer Verlag.
- Duden. (2020). Immersion. *Wörterbuch*. <https://www.duden.de/rechtschreibung/Immersion>
- Eberwein, T. (2017). Journalistisches Erzählen im Wandel. Ergebnisse einer Mehrmethodenstudie. In O. Hahn, R. Hohlfeld, & T. Knieper (Eds.), *Digitale Öffentlichkeit(en)* (pp. 107-120). Herbert von Halem Verlag.
- Egelhofer, J. L., & Lecheler, S. (2019). Fake news as a two-dimensional phenomenon: a framework and research agenda. *Annals of the International Communication Association*, 43(2), 97-116. <https://doi.org/10.1080/23808985.2019.1602782>
- Eifler, S., & Leitgöb, H. (2019). Experiment. In N. Baur & J. Blasius (Eds.), *Handbuch Methoden der empirischen Sozialforschung* (pp. 203-218). Springer VS.
- Enke, N., & Borchers, N. S. (2019). Social Media Influencers in Strategic Communication: A Conceptual Framework for Strategic Social Media Influencer Communication. *International Journal of Strategic Communication*, 13(4), 261–277. DOI: 10.1080/1553118X.2019.1620234
- Entman, R. (1993). Framing: Toward clarification of a fractured paradigm. *Journal of Communication*, 43, 51-58. DOI: 10.1111/j.1460-2466.1993.tb01304.x
- Evolution, and Epistemology*. University of Chicago Press.
- Fahr, A. (2013). Psychologische Ansätze der Wirkungsmessung. In W. Schweigert & A. Fahr (eds), *Handbuch Medienwirkungsforschung* (pp. 601-625). Springer Verlag.
- Faulstich, W. (2002). *Einführung in die Medienwissenschaft – Probleme, Methoden*. Fink-Verlag.
- Fox, J., Arena, D., & Baienson, J. N. (2009). Virtual Reality: A Survival Guide for the Social Scientist. *Journal of Media Psychology*, 21(3), 95-113. <https://doi.org/10.1027/1864-1105.21.3.95>
- Frigg, R., & Hartmann, S. (2020). Models in Science. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy*. <https://plato.stanford.edu/cgi-bin/encyclopedia/archinfo.cgi?entry=models-science>
- Frontiers in Robotics and AI*, 3, 74. <https://doi.org/10.3389/frobt.2016.00074>

- Garzón, J., Pavón, J., & Baldiris, S. (2019). Systematic review and meta-analysis of augmented reality in educational settings. *Virtual Reality*, 23, 447–459. <https://doi.org/10.1007/s10055-019-00379-9>
- Gil de Zúñiga, H., Weeks, B., & Ardèvol-Abreu, A. (2017). Effects of the news-finds-me perception in communication: Social media use implications for news seeking and learning about politics. *Journal of computer-mediated communication*, 22(3), 105-123. <https://doi.org/10.1111/jcc4.12185>
- Godulla, A. (2017). Mehr als lousy pennies? Etablierte vs. alternative Geschäftsmodelle im Online-Journalismus. In O. Hahn, R. Hohlfeld, & T. Knieper, *Digitale Öffentlichkeit(en)* (pp. 135-148). Herbert von Halem Verlag.
- Grau, O. (2003). *Virtual Art: From Illusion to Immersion*. MIT Press.
- Graves, L. & Anderson, C. W. (2020). Discipline and promote: Building infrastructure and managing algorithms in a structured journalism project by professional fact-checking groups. *New Media & Society*, 22(2): 342–360. DOI: 10.1177/1461444819856916
- Grigorovici, D. M. (2003). Persuasive effects of presence in immersive virtual environments. In G. Riva, F. Davide, & W. A. IJsselsteijn (Eds.), *Being there: Concepts, effects and measurements of user presence in synthetic environments* (pp. 192–207). Ios Press.
- Gynnild, A., Uskali, T., Jones, S., & Sirkkunen, E. (2020). What is immersive journalism. In T. Uskali, A. Gynnild, S. Jones, & E. Sirkkunen (Eds.), *Immersive Journalism as Storytelling: Ethics, Production, and Design* (pp. 1-9). Routledge.
- Hall, J., Graved, M., & Sargent, J. (2021). Participatory Research Approaches in Times of Covid-19: A Narrative Literature Review. *International Journal of Qualitative Methods*, 20, 1-15. <https://doi.org/10.1177/16094069211010087>
- Harcup, T. & O’Neill, D. (2017). What is News?, *Journalism Studies*, 18(12), 1470–1488. DOI: 10.1080/1461670X.2016.1150193
- Hardee, G. M. (2016). Immersive journalism in VR: Four theoretical domains for researching a narrative design framework. In S. Lackey, & R. Shumaker (Eds.), *Virtual, Augmented and Mixed Reality* (pp. 679-690). Springer.
- Hartmann, T., Böcking, S., Schramm, H., Wirth, W., Klimmt, C., & Vorderer, P. (2005). Räumliche Präsenz als Rezeptionsmodalität: Ein theoretisches Modell zur Entstehung von

- Präsenzerleben. In V. Gerau, H. Bilandzic, & J. Woelke (Eds.), *Rezeptionsstrategien und Rezeptionsmodalitäten* (pp. 21-37). Verlag Reinhard Fischer.
- Hartmann, T., Wirth, W., Schramm, H., Klimmt, C., Vorderer, P., Gysbers, A., Böcking, S., Ravaja, N., Laarni, J., Saari, T., Gouveia, F., & Sacau, A. M. (2016). The Spatial Presence Experience Scale (SPES): A short self-report measure for diverse media settings. *Journal of Media Psychology: Theories, Methods, and Applications*, 28(1), 1–15. <https://doi.org/10.1027/1864-1105/a000137>
- Hartmann, T., Wirth, W., Vorderer, P., Klimmt, C., Schramm, H., & Böcking, S. (2015). Spatial presence theory: State of the art and challenges ahead. In M. Lombard, F. Biocca, J. Freeman, W. IJsselsteijn, & R. Schaevitz (Eds.), *Immersed in media* (pp. 115-135). Springer.
- Hasebrink, U., & Domeyer, H. (2010). Zum Wandel von Informationsrepertoires in konvergierenden Mediumumgebungen. In M. Hartmann & A. Hepp. (Eds.), *Die Mediatisierung der Alltagswelt* (pp. 49-64). VS Verlag für Sozialwissenschaften.
- Hassan, R. (2020). Digitality, virtual reality, and the ‘empathy machine’. *Digital Journalism*, 8(2), 195-212. DOI: 10.1080/21670811.2018.1517604
- Hayes, A. F. (2018). The PROCESS Macro for SPSS and SAS version 3.0 [Computer software]. *afhayes.com*.
- Helfferich, C. (2019). Leifaden- und Experteninterviews. In N. Baur & J. Blasius (Eds.), *Handbuch Methoden der empirischen Sozialforschung* (pp. 669-689). Springer VS.
- Hendriks Vettehen, P., Wiltink, D., Huiskamp, M., Schaap, G., & Ketelaar, P. (2019). Taking the full view: How viewers respond to 360-degree video news. *Computers in Human Behavior*, 91, 24–32. DOI: 10.1016/j.chb.2018.09.018
- Hepp, A. (2013). The communicative figurations of mediatized worlds: Mediatization research in times of the ‘mediation of everything’. *European Journal of Communication*, 28(6), 615-629. DOI: 10.1177/0267323113501148
- Herrera, F., Bailenson, J. N., Weisz, E., Ogle, E., & Zaki, J. (2018). Building long-term empathy: A large-scale comparison of traditional and virtual reality perspective taking. *PLoS ONE*, 13(10), Article e0204494. DOI: 10.1371/journal.pone.0204494
- Higuera-Trujillo, J. L., Maldonado, J. L. T., & Millán, C. L. (2017). Psychological and physiological human responses to simulated and real environments: A comparison between



- photographs, 360 panoramas, and Virtual Reality. *Applied Ergonomics*, 65, 398–409. DOI: 10.1016/j.apergo.2017.05.006
- Hofer, M. (2016). *Presence and Involvement*. Nomos.
- Hudders, L., De Jans, S., & De Veirman, M. (2020). The commercialization of social media stars: A Literature Review and Conceptual Framework on the Strategic Use of Social Media Influencers. *International Journal of Advertising*, 40(3), 327-375. DOI: 10.1080/02650487.2020.1836925
- Huhtamo, E. (2008). Unterwegs in der Kapsel. Simulatoren und das Bedürfnis nach totaler Immersion. *Montage/av. Zeitschrift Für Theorie Und Geschichte Audiovisueller Kommunikation*, 17(2), 41–68. <https://doi.org/10.25969/mediarep/300>
- IJsselsteijn, W. A., De Ridder, H., Freeman, J., & Avons, S. E. (2000, June). Presence: concept, determinants, and measurement. In *Human vision and electronic imaging V* (pp. 520-529). SPIE.
- IJsselstein, W. A., & Riva, G. (2003). Being There: The Experience of Presence in Mediated Environments. In G. Riva, F. Davide, & W. A. IJsselstein (Eds.), *Being There: Concepts, Effects and Measurements of User Presence in Synthetic environments* (pp. 3-17). IOS Press.
- Isaac, M. (2022, July 26). ‘Operating With Increased Intensity’: Zuckerberg Leads Meta into Next
- Javornik, A., Marder, B., Barhorst, J. B., McLean, G., Rogers, Y., Marshall, P., & Warlop, L. (2022). ‘What lies behind the filter?’ Uncovering the motivations for using augmented reality (AR) face filters on social media and their effect on well-being. *Computers in Human Behavior*, 128, 107-126. <https://doi.org/10.1016/j.chb.2021.107126>
- Jones, R. & Jones, B. (2019.) Atomising the news: The (in)flexibility of structured journalism. *Digital Journalism*, 7(8), 1157–1179. DOI: 10.1080/21670811.2019.1609372
- Jones, S. (2017). Disrupting the Narrative: Immersive Journalism in Virtual Reality. *Journal of Media Practice*, 18, 171–185. DOI: 10.1080/14682753.2017.1374677
- Jørgensen, K. (2011). Time for new terminology? Diegetic and non-diegetic sounds in computer games revisited. In M. Grimshaw (Ed.), *Game Sound Technology and Player Interaction: Concepts and Developments* (pp. 78-97). IGI Global.
- Kang, S. (2020). Going beyond just watching: The fan adoption process of virtual reality spectatorship. *Journal of Broadcasting and Electronic Media*, 64(3), 499–518. <https://doi.org/10.1080/08838151.2020.1798159>

- Kang, S., O'Brien, E., Villarreal, A., Lee, W., & Mahood, C. (2018). Immersive journalism and telepresence: Does virtual reality news use affect news credibility? *Digital Journalism*, 7(2), 294–313. <https://doi.org/10.1080/21670811.2018.1504624>
- Kaplan, A. M., & Haenlein, M. (2009). Consumer use and business potential of virtual worlds: the case of 'second life'. *International Journal on Media Management*, 11(3), 93–101. DOI: 10.1080/14241270903047008
- Kardong-Edgren, S., Farra, S. L., Alinier, G., & Young, H. M. (2019). A Call to Unify Definitions of virtual reality. *Clinical Simulation in Nursing*, 31, 28–34. <https://doi.org/10.1016/j.ecns.2019.02.006>
- Karnowski, V., Kümpel, A. S., Leonhard, L., & Leiner, D. J. (2017). From incidental news exposure to news engagement. How perceptions of the news post and news usage patterns influence engagement with news articles encountered on Facebook. *Computers in Human Behavior*, 76, 42–50. <https://doi.org/10.1016/j.chb.2017.06.041>
- Katz, E., Blumler, J. G., & Gurevitch, M. (1973). Uses and gratifications research. *The public opinion quarterly*, 37(4), 509-523. <https://www.jstor.org/stable/2747854>
- Keen, S., Lornell-Rodriguez, M., & Joffe, H. (2022). From Challenge to Opportunity: Virtual Qualitative Research During COVID-19 and Beyond. *International Journal of Qualitative Methods*, 21, 1-11. <https://doi.org/10.1177/16094069221105075>
- Kelle, U. (2019). Mixed Methods. In N. Baur & J. Blasius (Eds.), *Handbuch Methoden der empirischen Sozialforschung* (pp. 159-172). Springer VS.
- Kim, J. (2021). Advertising in the Metaverse: Research Agenda. *Journal of Interactive Advertising*, 21(3), 141-144. DOI: 10.1080/15252019.2021.2001273
- Kirtiklis, K. (2017). Manuel Castells' theory of information society as media theory. *Lingua Posnaniensis*, 59(1), 65-77. DOI: 10.1515/linpo-2017-0006
- Kisker, J., Gruber, T., & Schöne, B. (2019). Experiences in virtual reality entail different processes of retrieval as opposed to conventional laboratory settings: A study on human memory. *Current Psychology*, 40(7), 3190-3197. DOI: 10.1007/s12144-019-00257-2
- Kloock, D., & Spar, A. (2000). *Medientheorien – Eine Einführung*. Fink-Verlag München.
- Koch, T., Peter, C. & Müller, P. (2019). *Das Experiment in der Kommunikations- und Medienwissenschaft. Grundlagen, Durchführung und Auswertung experimenteller Forschung*. VS Verlag.

- Kool, H. (2016). The Ethics of Immersive Journalism: A Rhetorical Analysis of News Storytelling with Virtual Reality Technology. *Intersect*, 9(3), 1-11. <https://ojs.stanford.edu/ojs/index.php/intersect/article/view/871/863>
- Korte, H. (2004). Einführung in die Systematische Filmanalyse. Ein Arbeitsbuch. Erich Schmidt Verlag.
- Kümpel, A. S. (2019). The Issue Takes It All?, *Digital Journalism*, 7(2), 165–186. <https://doi.org/10.1080/21670811.2018.1465831>
- Kümpel, A. S., Karnowski, V., & Keyling, T. (2015). News Sharing in Social Media: A Review of Current Research on News Sharing Users, Content, and Networks. *Social media + Society*, 1(2). <https://doi.org/10.1177/2056305115610141>
- Kunczik, M., & Zipfel, A. (2005). *Publizistik. Ein Studienhandbuch*. Böhlau Verlag.
- Lasswell, H. D. (1948). The structure and function of communication in society. In Bryson, L. (Ed.), *The Communication of Ideas*. Harper and Brothers.
- Lazer, D., Baum, M., Benkler, J., Berinski, A., Greenhill, K., Menczer, F., Metzger, M., Nyhan, B., Pennycook, G., Rothchild, D., Schudson, M., Sloman, S., Sunstein, C., Thorson, E., Watts, D., & Zittrain, J. (2018). The science of fake news. *Science*, 359, 1094-1096. DOI: 10.1126/science.aao2998
- Lecheler, S. (2020). The Emotional Turn in Journalism Needs to be About Audience Perceptions. *Digital Journalism*, 8(2), 287-291. DOI: 10.1080/21670811.2019.1708766
- Lee, K. M. (2004). Presence. Explicated. *Communication Theory*, 14(1), 27-50. <https://doi.org/10.1111/j.1468-2885.2004.tb00302.x>
- Lescop, L. (2017). *Narrative grammar in 360. 2017 IEEE International Symposium on Mixed and Augmented Reality (ISMAR-Adjunct)*, 254-257. DOI: 10.1109/ISMAR-Adjunct.2017.86
- Lessiter, J., Freeman, J., Keogh, E., & Davidoff, J. (2001). A Cross-Media Questionnaire: The ITC Sense of Presence Inventory. *Presence – Teleoperators and Virtual Environments*, 10(3), 282–297. <https://doi.org/10.1162/105474601300343612>
- Levinson, P. (2006). *Digital McLuhan: a guide to the information millennium*. Routledge.
- Lévy, P. (1999). *Collective Intelligence. Mankind's Emerging World in Cyberspace*. Perseus Books.
- Lévy, P. (2001). *Cyberculture*. The University of Minnesota Press.

- Li, H., Daugherty, T., & Biocca, F. (2002). Impact of 3-D Advertising on Product Knowledge, Brand Attitude, and Purchase Intention: The Mediating Role of Presence. *Journal of Advertising*, 31(3), 43-57. DOI: 10.1080/00913367.2002.10673675
- Logan, R. K. (2010). *Understanding New Media: Extending Marshal McLuhan*. Peter Lang.
- Lombard, M., & Ditton, T. (1997). At the Heart of It All: The Concept of Presence. *Journal of Computer-Mediated Communication*, 3(2) JCMC321. <https://doi.org/10.1111/j.1083-6101.1997.tb00072.x>
- Lopezosa, C., Codina, L., Fernandez-Planells, A., & Freixa, P. (2021). Journalistic innovation. How new formats of digital journalism and perceived in the academic literature. *Journalism*, OnlineFirst. <https://doi.org/10.1177/14648849211033434>
- Löwe, T., Stengel, M., Förster, E., Grogorick, S., & Magnor, M. (2017). Gaze Visualization for Immersive Video. In M. Burch, L. Chuang, F. Brian, A. Schmidt, & D. Weikopf (Eds.), *Eye Tracking und Visualization* (pp. 57-72) Springer Verlag.
- Mabrook, R., & Singer, J. B. (2019). Virtual reality, 360° video, and journalism studies: Conceptual approaches to immersive technologies. *Journalism Studies*, 20(14), 2096–2112. <https://doi.org/10.1080/1461670X.2019.1568203>
- Maes, C., & de Lenne, O. (2022). Filters and fillers: Belgian adolescents' filter use on social media and the acceptance of cosmetic surgery, *Journal of Children and Media*. DOI: 10.1080/17482798.2022.2079696
- Makowski, D., Sperduti, M., Nicolas, S., & Piolino, P. (2017). 'Being there' and remembering it: Presence improves memory encoding. *Consciousness and Cognition*, 53, 194–202. DOI: 10.1016/j.concog.2017.06.015
- Marasco, A., Buonincontri, P., van Niekerk, M., Orłowski, M., & Okumus, F. (2018). Exploring the role of next-generation virtual technologies in destination marketing. *Journal of Destination Marketing and Management*, 9, 138–148. <https://doi.org/10.1016/j.jdmm.2017.12.002>
- Martin, E. J. (2017, May 11). How Virtual and Augmented Reality Ads Improve Consumer Engagement. *VibrantMedia.com*. <https://www.vibrantmedia.com/blog/2017/05/11/virtual-augmented-reality-ads-improve-consumer-engagement/>

- Marwick, A. E. (2015). You May Know Me from YouTube: (Micro)-Celebrity in Social Media. In P. D. Marshall, & S. Redmond (Eds.), *A Companion to Celebrity* (pp. 333–350). John Wiley.
- Mayer, R. E., & Massa, L. J. (2003). Three Facets of Visual and Verbal Learners: Cognitive Ability, Cognitive Style, and Learning Preference. *Journal of Educational Psychology*, 95(4), 833–846. <https://doi.org/10.1037/0022-0663.95.4.833>
- Mayring, P., & Fenzl, T. (2019). Qualitative Inhaltsanalyse. In N. Baur & J. Blasius (Eds.), *Handbuch Methoden der empirischen Sozialforschung* (pp. 633-648). Springer VS.
- McGloin, R., Farrar, K., & Krmar, M. (2013). Video games, immersion, and cognitive aggression: does the controller matter? *Media Psychology*, 16(1), 65–87. <https://doi.org/10.1080/15213269.2012.752428>
- McLuhan, M. (1962). *The Gutenberg Galaxy: The Making of Typographic Man*. University of Toronto Press.
- McLuhan, M. (1964). *Understanding media: The Extension of Man*. The MIT Press.
- McLuhan, M. (1967). *The Media is the Message: An Inventory of Effects*. Bantam Books.
- McLuhan, M. (1992). *Die magischen Kanäle*. Econ.
- McLuhan, M. (1995). *Die Gutenberg-Galaxis. Das Ende des Buchzeitalters*. Addison-Wesley.
- McQuail, D., & Windahl, S. (1993). *Communication models for the study of mass communication*, 2<sup>nd</sup> edition. Routledge.
- McRoberts, J. (2017). Are We There Yet? Media content and sense of presence in non-fiction virtual reality. *Studies in Documentary Film*, 12(2), 101–118. DOI: 10.1080/17503280.2017.1344924
- Merten, K. (1994). Wirkungen von Kommunikation. In K. Merten, S. Schmidt, & S. Weischenberg (Eds.), *Die Wirklichkeit der Medien. Einführung in die Kommunikationswissenschaft* (pp. 291-328). Westdeutscher Verlag.
- Merten, K. (1999). *Einführung in die Kommunikationswissenschaft*. Lit Verlag.
- Meyen, M., Löblich, M., Pfaff Rüdiger, S., & Riesmeyer, C. (2019). *Qualitative Forschung in der Kommunikationswissenschaft. Eine praxisorientierte Einführung*. Springer VS.
- Meyerbröker, K., & Morina, N. (2021). The use of virtual reality in assessment and treatment of anxiety and related disorders. *Clinical Psychology*, 28(3), 466-476. DOI: 10.1002/cpp.2623

- Milgram, P., & Kishino, F. (1994). A taxonomy of mixed reality visual displays. *IEICE Transactions on Information and Systems*, 12(12),1321-1329. <http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.102.4646>
- Minsky, M. (1980). Telepresence. *Omni*, 2, 45–51. <https://philpapers.org/rec/MINT>
- Mögerle, U., Böcking, S., Wirth, W., & Schramm, H. (2006). Unterhaltungserleben in virtuellen Medien. Die Rolle von Medieneigenschaften und Personenmerkmalen beim Entstehen von Spatial Presence. In H. Schramm, W. Wirth, & H. Bilandzic (Eds.), *Empirische Unterhaltungsforschung: Studien zu Rezeption und Wirkung von medialer Unterhaltung*. (Vol. 8) (pp. 87- 106). Verlag Reinhard Fischer.
- Moghimi, M., Stone, R., Rotshtein, P., & Cooke, N. (2016). Influencing human affective responses to dynamic virtual environments. *Presence: Teleoperators and Virtual Environments*, 25(2), 81–107. DOI: 10.1162/PRES\_a\_00249
- Naderer, B., Peter, C., & Karsay, K. (2021). This picture does not portray reality: Developing and testing a disclaimer for digitally enhanced pictures on social media appropriate for Austrian tweens and teens. *Journal of Children and Media*, 16(2), 149-167. <https://doi.org/10.1080/17482798.2021.1938619>
- Narciso, D., Bessa, M., Melo, M., Coelho, A., & Vasconcelos-Raposo, J. (2017). Immersive 360° video user experience: Impact of different variables in the sense of presence and cybersickness. *Universal Access in the Information Society*, 18(1), 77–87. <https://doi.org/10.1007/s10209-017-0581-5>
- Nash, K. (2017). Virtual reality witness: exploring the ethics of mediated presence. *Studies in Documentary Film*, 12(2), 119–131. <https://doi.org/10.1080/17503280.2017.1340796>
- Nedelcu, D., & Balaban, D. C. (2021). The Role of Source Credibility and Message Credibility in Fake News Engagement. Perspectives from an Experimental Study. *Journal of Media Research*, 14(41), 42-62. DOI: 10.24193/jmr.41.3
- Neitzel, B. (2008). Facetten räumlicher Immersion in technischen Medien. *Montage/av. Zeitschrift für Theorie Und Geschichte Audiovisueller Kommunikation*, 17(2), 145–158. <https://doi.org/10.25969/mediarep/305>
- Newman, P. A., Guta, A., & Black, T. (2021). Ethical Considerations for Qualitative Research Methods During the COVID-19 Pandemic and Other Emergency Situations: Navigating

- the Virtual Field. *International Journal of Qualitative Methods*, 20, 1-12.  
<https://doi.org/10.1177/16094069211047823>
- Nielsen, S. L., & Sheets, P. (2019). Virtual hype meets reality: Users' perception of immersive journalism. *Journalism*, 1-17. <https://doi.org/10.1177/1464884919869399>
- Nowak, K. L., & Biocca, F. (2003). The effect of the agency and anthropomorphism on users' sense of telepresence, copresence, and social presence in virtual environments. *Presence: Teleoperators & Virtual Environments*, 12(5), 481-494.  
<https://doi.org/10.1162/105474603322761289>
- O'Reilly, T. (2005). What is Web 2.0. Design Patterns and Business Models for the Next Generation of Software. *Author*. <https://www.oreilly.com/pub/a/web2/archive/what-is-web-20.html>
- Omnia 360. (2022). 360-know how. *Author*. <https://omnia360.de/blog/category/360-know-how/>
- Opriş, D., Pinteă, S., Garcia Palacios, A. G., Szamoskozi, S., & David, D. (2016). Virtual reality exposure therapy in anxiety disorders: a quantitative meta-analysis. *Depression & Anxiety*, 29(2), 85-93. DOI: 10.1002/da.20910
- Oschatz, O., Maurer, M., & Haßler, J. (1917). Klimawandel im Netz: Die Digitalisierung von Informationskanälen und ihre Folgen für die Öffentlichkeit. In O. Hahn, R. Hohlfeld, & T. Knieper (Eds.), *Digitale Öffentlichkeit(en)* (pp. 149-164). Herbert von Halem Verlag.
- Owen, T., Pitt, F., Aronson-Rath, R., & Milward, J. (2015, November 11). Virtual reality journalism. Tow Center for Digital Journalism. *Towcenter.org*.  
<http://towcenter.org/research/virtual-reality-journalism>
- Page, K. L. (2015). Virtual reality. In Cooper C. L. (Ed), *Wiley Encyclopedia of Management*. Wiley online library.
- Palmer, L. (2020). "Breaking Free" from the frame: International human rights and the New York Times' 360-degree video journalism. *Digital Journalism*, 8(3), 386-403.  
<https://doi.org/10.1080/21670811.2019.1709982>
- Papacharissi, Z. (2008). Uses and gratifications. In M. Salwen, & D. Stacks (Eds.), *Uses and gratifications: An integrated approach to communication theory and research* (pp. 137-152). Lawrence Erlbaum.

- Pavlik, J., & Bridges, F. (2013). The Emergence of Augmented Reality (AR) as a Storytelling Medium in Journalism. *Journalism and Communication Monographs*, 15(1), 3–59. <https://doi.org/10.1177/1522637912470819>
- Phase. Facebook’s founder is setting a relentless pace as he pushes his company through a tech transformation during a global economic slowdown. *The New York Times*. <https://www.nytimes.com/2022/07/26/technology/zuckerberg-meta-facebook-earnings.html>
- Philipot, A. (2017). Effects of Camera Position on Perception of Self In 360 Degree Video and Virtual Environments. *TVX '17 Adjunct: Adjunct Publication of the 2017 ACM International Conference on Interactive Experiences for TV and Online Video*, 87–91. <https://doi.org/10.1145/3084289.3084290>
- Phua, J., Jin, S.V., & Kim, J. (2017). Uses and gratifications of social networking sites for bridging and bonding social capital: A comparison of Facebook, Twitter, Instagram, and Snapchat. *Computers in Human Behavior*, 72, 115-122. <https://doi.org/10.1016/j.chb.2017.02.041>
- Pjesivac, I., Wojdyski, B. W., Binford, M. T., Kim, J., & Herndon, K. L. (2021). Using Directional Cues in Immersive Journalism: The Impact on Information Processing, Narrative Transportation, Presence, News Attitudes, and Credibility. *Digital Journalism*. DOI: 10.1080/21670811.2021.1897473
- Przyborski, A., & Wohlrab-Sahr, M. (2019). Forschungsdesign für qualitative Sozialforschung. In N. Baur & J. Blasius (Eds.), *Handbuch Methoden der empirischen Sozialforschung* (pp. 105-123). Springer VS.
- Pulitzer.org. (2018). Staffs of The Arizona Republic and USA Today Network. *Author*. <https://www.pulitzer.org/winners/staffs-arizona-republic-and-usa-today-network>
- Rauschnabel, P. A. (2018). Virtually enhancing the real world with holograms: An exploration of expected gratifications of using augmented reality smart glasses. *Psychology & Marketing* 35(8), 557–572. <https://doi.org/10.1002/mar.21106>
- Reis, A. B., & Coelho, A. F. V. C. C. (2018). Virtual Reality and journalism: A gateway to conceptualizing immersive journalism. *Digital Journalism*, 6(8), 1090–1100. <https://doi.org/10.1080/21670811.2018.1502046>
- Rice, R., & Antkin, C. (2013). *Public Communication Campaigns*. Sage.



- Riva, G., Malighetti, C., & Serino, S. (2021). Virtual reality in the treatment of eating disorders. *Clinical Psychology*, 28(3), 477-488. DOI: 10.1002/cpp.2622
- Riva, G., Mantovani, F., Capideville, C. S., Preziosa, A., Morganti, F., Villani, D., Gaggioli, A., Botella, C., & Alcaniz, M. (2007). Affective interactions using virtual reality: the link between presence and emotions. *CyberPsychology & Behavior*, 10, 45–56. DOI: 10.1089/cpb.2006.9993
- Robinson, S., & DeShano, C. (2011). ‘Anyone can know’: Citizen journalism and the interpretive community of the mainstream press. *Journalism*, 12(8), 963-982. DOI: 10.1177/1464884911415973
- Rogers, E. M. (1965). *Diffusion of Innovation* (1<sup>st</sup> edition). Free Press.
- Rogers, E. M. (1986). *Communication Technology: The New Media in Society*. Free Press.
- Rose, M. (2018). The immersive turn: hype and hope in the emergence of virtual reality as a nonfiction platform, *Studies in Documentary Film*, 12(2), 132-149. DOI: 10.1080/17503280.2018.1496055
- Rosengren, K. E. (1994). Culture, Media and Society. Agency and Structure, Continuity and Change. In K. E. Rosengren (Ed.), *Media Effect and Beyond. Culture, Socialization and Lifestyles* (pp. 3-29). Routledge.
- Sacau, A., Laarni, J., & Hartmann, T. (2008). Influence of individual factors on presence. *Computer in Human Behavior*, 24(5), 2255–2273. <https://doi.org/10.1016/j.chb.2007.11.001>
- Sánchez Laws, A. L. (2017). Can immersive journalism enhance empathy? *Digital Journalism*, 8(2), 213–228. <https://doi.org/10.1080/21670811.2017.1389286>
- Sanchez Lopez, I., Presez-Rodriguez, A., & Fandos-Igaldo, M. (2020). The explosion of digital storytelling. Creator's perspective and creative processes on new narrative forms. *Helyon*, 6(9), e04809. <https://doi.org/10.1016/j.heliyon.2020.e04809>
- Saxer, U. (2012). *Mediengesellschaft. Eine kommunikationssoziologische Perspektive*. Springer VS.
- Scheufele, D. A. (1999). Framing as a theory of media effects. *Journal of communication*, 49(1), 103-122. <https://doi.org/10.1111/j.1460-2466.1999.tb02784.x>
- Scheufele, D. A., & Iyengar, S. (2012). The state of framing research: A call for new directions. In Kenski, K., & K. H. Jamieson (Eds.), *The Oxford Handbook of Political Communication*

- Theories* (pp. 1-18). Oxford University Press.  
<http://10.1093/oxfordhb/9780199793471.013.47>
- Schmidt, S. (1996). *Die Welten der Medien. Grundlagen und Perspektiven der Medienbeobachtung*. Vieweg.
- Schmidt, S. (1998). *Die Zählung des Blicks. Konstruktivismus-Empirie-Wissenschaft*. Suhrkamp.
- Schouten, A. P., van den Hooff, B., & Feldberg, F. (2016). Virtual team work: Group decision making in 3D virtual environments. *Communication Research*, 43(2).  
<https://doi.org/10.1177/0093650213509667>
- Schroth, O., Angel, J., Sheppard, S., & Dulic, A. (2014). Visual climate change communication: from iconography to locally framed 3D visualization. *Environmental Communication*, 8(4), 413-432. <https://doi.org/10.1080/17524032.2014.906478>
- Schubert, T., Friedmann, F., & Regenbrecht, H. (2001). The Experience of Presence: Factor Analytic Insights. *Presence – Teleoperators and Virtual Environments*, 10(3), 266–281.  
<https://doi.org/10.1162/105474601300343603>
- Schulzke, M. (2014). The Virtual culture industry: Work and play in virtual worlds. *The Information Society*, 30(1), 20-30. <https://doi.org/10.1080/01972243.2013.855689>
- Schuster, K. (2015). *Einfluss natürlicher Benutzerschnittstellen zur Steuerung des Sichtfeldes und der Fortbewegung auf Rezeptionsprozesse in virtuellen Lernumgebungen*. Tectum Verlag Marburg.
- Sheridan, T. B. (1992). Musings on telepresence and virtual presence. *Presence: Teleoperators and Virtual Environments*, 1, 120–126. <https://doi.org/10.1162/pres.1992.1.1.120>
- Sherry, D. F., & Schacter, D. L. (1987). The evolution of multiple memory systems. *Psychological Review*, 94, 439–454. <https://doi.org/10.1037/0033-295X.94.4.439>
- Shin, D., & Biocca, F. (2017). Exploring immersive experience in journalism. *New Media & Society*, 20(8). DOI:10.1177/1461444817733133
- Sirkunen, E., & Uskali, T. (2019). Virtual reality journalism. In T. P. Vos & F. Hanusch (Eds.), *The international encyclopedia of journalism studies* (pp. 1-5). Wiley.
- Skarbez, R., Smith, M., & Whitton, M. C. (2021). Revisiting Milgram and Kishino's Reality-Virtuality Continuum. *Frontiers in Virtual Realty*, 2, 647997. DOI: 10.3389/frvir.2021.647997

- Slater, M. (1999). Measuring presence: A response to the Witmer and Singer presence questionnaire. *Presence: Teleoperators and Virtual Environments*, 8(5), 1–13. <https://doi.org/10.1162/105474699566477>
- Slater, M. (2003). A note to presence terminology. [http://www0.cs.ucl.ac.uk/research/vr/Projects/Presencia/ConsortiumPublications/ucl\\_cs\\_papers/presence-terminology.htm](http://www0.cs.ucl.ac.uk/research/vr/Projects/Presencia/ConsortiumPublications/ucl_cs_papers/presence-terminology.htm)
- Slater, M. (2004). How Colorful Was Your Day? Why Questionnaires Cannot Assess Presence in Virtual Environments. *Presence: Teleoperators and Virtual Environments*, 13(4), 484–493. <https://doi.org/10.1162/1054746041944849>
- Slater, M. (2009). Place illusion and plausibility can lead to realistic behaviour in immersive virtual environments. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 12(1535), 3549-3557. doi: 10.1098/rstb.2009.0138
- Slater, M., & Sanchez-Vives, M. V. (2016). Enhancing Our Lives with Immersive Virtual Reality.
- Slater, M., & Wilbur, S. (1997). A Framework for Immersive Virtual Environments (FIVE): Speculations on the Role of Presence in Virtual Environments. *Computer Science, Presence: Teleoperators & Virtual Environments*. DOI:10.1162/pres.1997.6.6.603
- Song, H., Kim, J., Nguyen, T. P. H., Lee, K. M., & Park, N. (2020). Virtual reality advertising with brand experiences: the effects of media devices, virtual representation of the self, and self-presence. *International Journal of Advertising*, 40(7), 1096-1114. <https://doi.org/10.1080/02650487.2020.1834210>
- Song, H., Kim, J., Nguyen, T. P. H., Lee, K. M., & Park, N. (2020). Virtual reality advertising with brand experiences: the effects of media devices, virtual representation of the self, and self-presence. *International Journal of Advertising*, 1–19. <https://doi.org/10.1080/02650487.2020.1834210>
- Spielmann, N., & Orth, U. R. (2020). Can advertisers overcome consumer qualms with virtual reality? *Journal of Advertising Research*, JAR-2020-015. <https://doi.org/10.2501/JAR-2020-015>
- Spielmann, N., & Orth, U. R. (2020). Can advertisers overcome consumer qualms with virtual reality?. *Journal of Advertising Research*, JAR-2020-015. <https://doi.org/10.2501/jar-2020-015>

- Spohr, D. (2017). Fake news and ideological polarization: Filter bubbles and selective exposure on social media. *Business Information Review*, 34(3), 150-160. <https://doi.org/10.1177/0266382117722446>
- Stanley, B. (2015). *Uses and gratifications of temporary social media: A comparison of Snapchat and Facebook*. Fullerton.
- Steuer, J. (1992). Defining virtual reality: dimensions determining telepresence. *Journal of Communication*, 42(4), 73–93. DOI: 10.1111/j.1460-2466.1992.tb00812.x
- Sundar, S. S. (2008). The MAIN Model: A Heuristic Approach to Understanding Technology Effects on Credibility. In M. J. Metzger and A. J. Flanagin (Eds.), *Digital Media, Youth, and Credibility* (pp. 73-100). The MIT Press. DOI: 10.1162/dmal.9780262562324.073
- Sundar, S. S., Kang, J., & Oprean, D. (2017). Being there in the midst of the story: How immersive journalism affects our perceptions and cognitions. *Cyberpsychology, Behavior, and Social Networking*, 20(11), 672–682. <https://doi.org/10.1089/cyber.2017.0271>
- Takac, M., Collett, J., Conduit, R., & De Foe, A. (2021). Addressing virtual reality misclassification: A hardware-based qualification matrix for virtual reality technology. *Clinical Psychology*, 28(3), 538-556. DOI: 10.1002/cpp.2624
- Tandoc, E. C. J., Lim, Z. W., & Ling, R. (2018). Defining “fake news”. *Digital Journalism*, 6(2), 137–153. DOI: 10.1080/21670811.2017.1360143
- Theall, D. (2014). *The Virtual Marshall McLuhan*. McGill-Queen's University Press.
- Tucker, J. A., Guess, A., Barberá, P., Vaccari, C., Siegel, A., Sanovich, S., Stukal, D., & Nyhan, B. (2018). Social Media, Political Polarization, and Political Disinformation: A Review of the Scientific Literature. *SSRN*. <http://dx.doi.org/10.2139/ssrn.3144139>
- Van Damme, K., All, A., De Marez, L., & Van Leuven, S. (2019). 360° video journalism: Experimental study on the effect of immersion on news experience and distant suffering. *Journalism Studies*, 20(14), 2053–2076. <https://doi.org/10.1080/1461670X.2018.1561208>
- Van Dijck, J. (2013). *The culture of connectivity: A critical history of social media*. Oxford University Press.
- Van Dijck, J., Poell, T., & de Waal, M. (2018). *The Platform Society: Public Values in a Connective World*. Oxford University Press.
- Van Kerrebroeck, H., Brengman, M., & Willems, K. (2017). When brands come to life: Experimental research on the vividness effect of virtual reality in transformational

- marketing communications. *Virtual Reality*, 21(4), 177–191. DOI: 10.1007/s10055-017-0306-3
- Visch, V. T., Tan, S., & Molenaar, D. (2010). The emotional and cognitive effect of immersion in film viewing. *Cognition and emotion*, 24(8), 1439-1445. DOI: 10.1080/02699930903498186
- Von Foerster, H. (2007). *Understanding Understanding: Essays on Cybernetics and Cognition*. Springer Verlag.
- Wahl-Jorgensen, K. (2020). An Emotional Turn in Journalism Studies?. *Digital journalism*, 8(2), 175-194. DOI: 10.1080/21670811.2019.1697626
- Waller, D., Knapp, D., & Hunt, E. (2001). Spatial Representations of Virtual Mazes: The Role of Visual Fidelity and Individual Differences. *Human Factors and Ergonomics Society*, 43(1), 147–158. DOI: 10.1518/001872001775992561
- Wardle, C., & Derakhshan, H. (2017). Information disorder: Toward an interdisciplinary framework for research and policy-making. *Council of Europe Report*, DGI, 9. <http://tverezo.info/wp-content/uploads/2017/11/PREMS-162317-GBR-2018-Report-desinformation-A4-BAT.pdf>
- Watson, Z. (2017). *VR for News: The New Reality? Digital News Project 2017*. Reuters Institute for the Study of Journalism.
- Weber, S. (2003). *Theorien der Medien. Von der Kulturkritik bis zum Konstruktivismus*. 2nd edition, UKV Konstanz.
- Whiting, A., & Williams, D. (2013). Why people use social media: a uses and gratifications approach. *Qualitative Market Research: An International Journal*, 16(4): 362-369. <http://doi.org/10.1108/QMR-06-2013-0041>
- Williams, D., Contractor, N., Poole, M. S., Srivastava, J., & Cai, D. (2011). The virtual worlds exploratorium: Using large-scale data and computational techniques for communication research. *Communication Methods and Measures*, 5(2), 163–180. DOI: 10.1080/19312458.2011.568373
- Williams, E. R., Love, M. & Love, C. (2021). *Virtual reality cinema. Narrative tips & techniques*. Routledge.

- Wirth, W., & Hofer, M. (2008). Präsenzerleben. Eine medienpsychologische Modellierung. *Montage AV. Zeitschrift für Theorie und Geschichte audiovisueller Kommunikation*, 17(2), 159-175. <https://doi.org/10.25969/mediarep/304>
- Wirth, W., Hartmann, T., Böcking, S., Vorderer, P., Klimmt, C., Schramm, H., Saari, T., Laarni, J., Ravaja, N., Ribeiro Gouveia, F., Biocca, F., Sacau, A., Jäncke, L., Baumgartner, T., & Jäncke, P. (2007). A Process Model of the Formation of Spatial Presence Experiences. *Media Psychology*, 9(3), 493-525. DOI: 10.1080/15213260701283079
- Witmer, B., & Singer, M. (1998). Measuring Presence in Virtual Environments: A Presence Questionnaire. *Presence – Teleoperators and Virtual Environments*, 7(3), 225 –240. <https://doi.org/10.1162/105474698565686>
- Xu, X. (2022). To social with social distance: a case study on a VR-enabled graduation celebration amidst the pandemic. *Virtual Reality*. <https://doi.org/10.1007/s10055-022-00646-2>
- Yang, J., Lee, I., & Lee, S. (2019). Is social VR possible to be the new journalism? The effects of other users' opinions on the attitude and perception of public opinion when consuming contents in VR. *International Journal of Innovative Technology and Exploring Engineering*, 8(8S2), 2278–3075.
- Zhou, N. N., & Deng, Y. L. (2009). Virtual reality: A state-of-the-art survey. *International Journal of Automation and Computing*, 6(4), 319–325. <https://doi.org/10.1007/s11633-009-0319-9>