CUADERNOS.INFO Nº 56
Versión electrónica: ISSN 0719-367x
http://www.cuadernos.info
https://doi.org/10.7764/cdi.56.60193

Received: 03-31-2023 / Accepted: 08-08-2023

I enjoy 360° video news more, but understand them less! Gratification gained in virtual reality journalism research

¡Disfruto más, pero comprendo menos, las noticias en video 360°! Gratificaciones obtenidas en la investigación del periodismo de realidad virtual

Gosto mais das notícias em vídeo 360°, mas as entendo menos! Gratificações obtidas com a pesquisa de jornalismo de realidade virtual

Juan Camilo Hernández-Rodríguez, Universidad de La Sabana, Colombia (Juan.hernandez1@unisabana.edu.co)

Víctor García-Perdomo, Universidad de La Sabana, Colombia (Victor.garcia2@unisabana.edu.co)

ABSTRACT | Thanks to technologies such as virtual reality (VR), the metaverse promises to have a place for journalism. Its development, however, is unclear. This experimental research aims to shed light on what real gratifications (obtained gratifications, OG) users might gain from exposure to 360° video news stories, experienced with Oculus Quest goggles, compared to those exposed to a multimedia reportage on a computer screen. The study analyzes OGs for knowledge, comprehension, credibility, emotional engagement, empathy, and enjoyment. The gratification reported by the participants exposed to VR (university students) was that of enjoyment and, consistently, this virtual content generated greater satisfaction than traditional multimedia. Nonetheless, the research shows that multimedia news stories with a strong textual component still yield better results in knowledge and understanding of the news event when compared to immersive technologies.

KEYWORDS: uses and gratifications; virtual reality journalism; 360° video; enjoyment; knowledge; understanding; credibility.

HOW TO CITE

Hernández-Rodríguez, J. C., & García-Perdomo, V. (2023). ¡Disfruto más, pero comprendo menos, las noticias en video 360°! Gratificaciones obtenidas en la investigación del periodismo de realidad virtual. *Cuadernos.info*, (56), 313-333. https://doi.org/10.7764/cdi.56.60193

RESUMEN | *El metaverso, gracias a tecnologías como la realidad virtual (RV), promete tener un lugar para el periodismo. Su desarrollo, empero, no está claro. Esta investigación experimental pretende ofrecer luces respecto de qué gratificaciones reales podrían conseguir (gratificaciones obtenidas, GO) los usuarios al exponerse a historias informativas en video 360°, experimentadas con gafas Oculus Quest, en comparación con aquellos que lo hacen a un reportaje multimedia en la pantalla de una computadora. El estudio analiza las GO de conocimiento, comprensión, credibilidad, compromiso emocional, empatía y disfrute. La gratificación que reportaron los participantes (estudiantes universitarios) fue la del disfrute y, en coherencia, este contenido virtual les generó mayor satisfacción que la multimedia tradicional. La investigación revela, sin embargo, que las historias periodísticas multimediales con fuerte componente textual siguen arrojando mejores resultados en conocimiento y comprensión del acontecimiento noticioso al compararlas con las tecnologías inmersivas.*

PALABRAS CLAVE: *usos y gratificaciones; periodismo de realidad virtual; video 360°; disfrute; conocimiento; comprensión; credibilidad.*

RESUMO | O metaverso, graças às tecnologias como a realidade virtual (VR), promete dar lugar ao jornalístico. Seu desenvolvimento, no entanto, não é claro. Esta pesquisa experimental visa esclarecer sobre as gratificações reais que os usuários poderiam obter (gratificações obtidas, GO) ao se exporem a histórias informativas em vídeo 360 graus, vivenciadas com os óculos Oculus Quest, em comparação com usuários que o fazem a uma reportagem multimídia na tela do computador. O estudo analisa as GOs de conhecimento, compreensão, credibilidade, compromisso emocional, empatia e desfrute. A gratificação que os participantes expostos à RV (estudantes universitários) relataram foi o desfrute e, consistentemente, esse conteúdo virtual gerou maior satisfação do que a multimídia tradicional. A pesquisa revela, no entanto, que as notícias multimídia com forte componente textual continuam a ter melhores resultados em termos de conhecimento e compreensão do evento noticioso quando comparadas às tecnologias imersivas.

PALAVRAS-CHAVE: usos e gratificações; jornalismo de realidade virtual; vídeo 360°; desfrute; conhecimento; compreensão; credibilidade.

INTRODUCTION

According to forecasts by Bloomberg Intelligence ("Metaverse may be...", 2021), the global market for the so-called metaverse will reach $783.3 billion in 2024, up from $478.7 billion in 2020. The auspicious scenario is explained, among other reasons, by the bold investments of technology giants to develop mixed reality worlds –a combination of physical environments, augmented reality (AR) and virtual reality (VR). Even though today half of the metaverse market is dominated by the video game industry, the question that arises is which other players and industries will enter the market and compete for it?

The Reuters Institute for the Study of Journalism seemed to provide part of the answer to this question, which in one of its trend reports stated that "it's still early days but if more time is spent in virtual worlds, at least some of it is bound to be spent with news" (Newman, 2022, p. 40). Although the report is cautious in pointing out future scenarios and warns of skepticism among media editors and reporters in investing resources for product development in the metaverse, it notes that there are already newsrooms reporting from there. Likewise, for at least a decade, media outlets such as *The New York Times*, *The Guardian* and *El País* have been producing immersive reportages using computer-generated imagery (CGI) and 360° video (de Bruin et al., 2020; Watson, 2017; De la Peña et al., 2010).

The latter is called virtual reality journalism. It isolates users from their physical world[1] to immerse them in a three-dimensional virtual environment, of high sensory richness, recreated with spherical video (180° or 360°), with IGC or mixing both resources (Paíno & Rodríguez, 2019). This type of journalism aims for the users to be first-hand witnesses of the news event (Da Costa & Brasil, 2017; De la Peña et al., 2010), while experiencing different degrees of presence, embodiment, and interactivity, while a living narrative (storyliving) of non-fiction surrounds them (Baía et al., 2023; Maschio, 2021; Steed et al., 2018; Sundar et al., 2017).

The uncertainty about the eventual effectiveness of so-called VR journalism can be reduced with information from empirical studies. Therefore, the objective of this research is to examine what gratifications a user derives, and to what degree, from experiencing a VR news story –specifically with 360° video– as compared to consuming a multimedia story from a computer screen. In the field of media effects, this can be investigated by employing uses and gratifications (U&G) theory (Katz et al., 1973).

1. Isolation from the physical or material world happens with the use of VR goggles (HMD) and haptic devices or CAVE.

Overall, this article first succinctly describes VR journalism and the U&G theory; then formulates a series of research questions and hypotheses based on that theory and presents the corresponding methodological design; then states and discusses the results, and finally offers some conclusions and recommendations.

U&G THEORY AND VR JOURNALISM

Vorderer and colleagues (2020) have called evergreen theories the set of postulates that have remained relevant over the years, with varying degrees of updating, to investigate the media. These include the uses and gratifications (U&G) theory, which departed from the classical approach of communication effects studies that generally inquired about the cognitive consequences of media and messages on people to ask, rather, about what they do and the reasons why audiences adopt certain media and messages to satisfy their different needs (McQuail, 1984; Katz et al., 1973).

Scholars such as Palmgreen and Rayburn (1979) have formulated a conceptual distinction between gratifications sought (GS) and gratifications obtained (OG). GS are those close to the motives of audiences or the gains they expect, prior to the use of a specific medium. Meanwhile, OG are the real satisfactions that audiences achieve after consumption.

Satisfaction is at the core of the U&G theory. Satisfaction is achieved if the media and the selected content provide users with a feeling of fulfillment regarding the GS. If these expectations are not met, there will be a feeling of disappointment for users and, therefore, they will look for another media stimulus or another functional alternative that does respond to their needs (Palmgreen & Rayburn, 1979). Thus, the degree of satisfaction is directly related to users' intention to continue exposing themselves to a specific media content or to their intention to recommend it to others (Liou et al., 2015).

U&G theory's flexible nature makes it particularly timely when studying emerging phenomena derived from the introduction of new media and communication platforms (Ruggiero, 2000). In that vein, research from U&G theory has been done regarding VR and tourism services (Kim et al., 2020) and the use of AR smart glasses (Rauschnabel, 2018) but, conversely, the relationship between such theory and VR journalism is incipient. Nielsen and Sheets (2019), based on U&G, concluded that six audience gratifications, grouped into three categories, derive from immersive experiences: experiential (immersion and narrative transportation), affective (emotion and empathy), and agency or control (controlling the experience and obtaining/simplifying information).

The scholars derived this finding using qualitative research (focus groups) and focusing on what might be termed gratifications during the immersion process. Next, Kim and Lee (2022) also identified the following motivations in audiences to consume VR news from the U&G perspective and using surveys: getting fun (or enjoyable) information, seeking social or peer validation, and finding useful news content. Thus, there is an opportunity to advance experimental studies, within the framework of U&G theory, that account for OGs after the user is exposed to VR journalistic content.

It is worth noting that, without relying on the U&G theory, several scholars have explored the possible effects of immersive technologies. Research that has compared user exposure between a 360° video and a digital article has reported, in favor of the former, greater feelings of realism and involvement in the news scene (Vázquez-Herrero & Sirkkunen, 2022), greater credibility (Hendriks et al., 2019) and empathy (Sundar et al., 2017). It turned out to be also a more enjoyable experience and motivating to re-consumption (Vázquez-Herrero & Sirkkunen, 2022; Van Damme et al., 2019). However, enjoyment can hinder empathy towards the characters in the story and their negative emotions (Barreda-Ángeles et al., 2020a). Although there are studies that argue that textual content is more successful in ensuring the comprehension of facts, there are still no conclusive results (Aitamurto et al., 2020). According to some academics and journalistic producers, one of the strengths of 360° video is that it helps to understand and offer a more contextualized image of the news event (Domínguez-Martín, 2015; Pérez-Seijo, 2023).

RESEARCH QUESTIONS AND HYPOTHESES

A number of studies on the effects of immersive technologies serve to enunciate that some of the potential OGs in VR journalism can be knowledge, understanding, credibility, emotional engagement, empathy, and enjoyment. We use the same literature to formulate a set of hypotheses and questions outlined in the following paragraphs:

For journalism, knowledge is the acquisition of information by citizens about the constituent elements of a public event (Kovach & Rosenstiel, 2012). Consistently, research on VR journalism does not evidence improvements in knowledge when the user consumes this type of storytelling (Jeong et al., 2020). On the contrary, the elicitation and recall of news details tends to decrease due to the cognitive overload produced by the multiplicity of stimuli in three-dimensional scenarios (Barreda-Angeles et al., 2020b; Sundar et al., 2017). Therefore, we pose the following hypothesis:

> *H1.* The higher the degree of immersion in the journalistic content, the lower the user's knowledge of the news event.

Comprehension is the process by which audiences assign meaning to the content –to the immersive information story, in this case– based on their experiences and motivation levels (Pérez & Hernández, 2014). Even the surfacing of emotions (positive or negative) favors comprehension (Mundhenke, 2022). Research results on the facilitation of comprehension in VR journalism are mixed: there are those who fully ratify its elicitation during the experience (Barnidge et al., 2021; Domínguez-Martín, 2015; De la Peña et al., 2010) and those who find no significant differences in comprehension between 2D and 3D video stories (Hendriks et al., 2019). Therefore, we prefer to ask the following question:

> *RQ1.* Does a higher degree of immersion in journalistic content imply that users will have a better understanding of the content?

Another potential OG is credibility, which is understood as the degree of trust that a person places in the content broadcast by a media outlet or journalist and perceived to be accurate and timely (Metzger et al., 2003). Studies mostly show that credibility in VR news content with interactivity is higher than in cases of VR without interactivity (Shin & Biocca, 2018; Wu, Cai, Luo, et al., 2021), as it offers greater tools to dialogue with the content. Trust in full VR news stories is also higher compared to that reported in 360° video and plain text stories. Considering the above, the following hypothesis is posed:

> *H2.* The higher the immersion degree in journalistic content, the higher the users' credibility towards the content.

If the former gratifications can be referred to as cognitive in nature, the next two are affective in nature. The first is emotional engagement, a complex system of feelings that affects both thinking and behavior (Myers, 2004). Although there is not full agreement on the main universal emotions, a good basis is provided by Plutchik (2001) who lists eight: joy, sadness, anger, fear, acceptance, disgust, surprise, and hope. Empirical research points out that emotional engagement is proportional to depth in immersion (Bujić, 2021; Sanchez Laws, 2020; Archer & Finger, 2018). A higher degree of emotion in interactive virtual reality is explained, among other reasons, by the increased freedom and autonomy it offers (Wu, Cai, Liu, et al., 2021), as well as the sense of presence it supplies (de Bruin et al., 2020). Following this review, the following hypothesis is proposed

> *H3.* The greater the degree of immersion in journalistic content, the greater the user's emotional engagement with the event and its protagonists.

Empathy, which, strictly speaking, is not an emotion, deserves to be analyzed separately. Rather, it is a human capacity that has cognitive, emotional, and motivational dimensions (Archer & Finger, 2018; Janssen, 2012). Research findings on empathy have varied widely. On the one hand, there are those that argue that stories in VR and 360° video generate greater empathy in the audience, regarding the characters, than plain text narratives (Sundar et al., 2017) and, on the other, those that support the direct effects of immersive environments on perspective taking and empathic concern (Barreda-Ángeles et al., 2020a). Some studies, moreover, find no significant differences in empathic surfacing between formats such as full virtual reality, 360° video, and 2D video (Wu, Cai, Liu, et al., 2021; Steinfeld, 2020)), which would demonstrate that VR does not shorten the distance between the audience and the suffering of the person involved in, for example, disaster news (Van Damme et al., 2019). Given the lack of clarity regarding the direction of this variable, this question arises:

> *RQ2*. Will a greater degree of immersion in journalistic content entail a greater empathy expressed by the user towards the event and its protagonists?

Enjoyment concerns the user's perception of whether the immersive experience was pleasurable or fun (Venkatesh, 2000); i.e., VR content, even if journalistic, could serve the person, in some cases, as an escape valve from everyday activities, to relax and be entertained (Rauschnabel, 2018). Barreda-Angeles and colleagues (2020a) point out that immersive storytelling enhances enjoyment since it stimulates the user's curiosity to explore the three-dimensional scenario and provokes excitement because of the sense of presence. Yang (2023) emphasizes that audiences find greater value in informative content when they have fun with it. It is suggested, then, as a hypothesis:

> *H4*. The greater the degree of immersion in the journalistic content, the more the user enjoys the story.

Finally, achieving some or all of the OGs may materialize in the expression of user satisfaction in consuming a media content. Recently, some scholars have found evidence that journalistic VR stories meet audiences' expectations and, incidentally, affect their intentions to consume similar experiences again (Bujić, 2021; Shin & Biocca, 2018). Therefore, these two hypotheses are formulated:

> *H5*. There will be a higher satisfaction degree with the content for those users who consume the VR story when compared to participants who watch the story in traditional multimedia formats.
>
> *H6*. There will be a higher degree of intent to re-expose or recommend a VR story compared to a multimedia story.

METHOD

This research is quantitative and uses the experiment as a method, one of the most internally valid techniques for the study of the media and its effects on audiences.

Call and distribution of participants

Students from academic programs at the Universidad de La Sabana in Colombia were invited to participate in the experiment by e-mail. In exchange for their participation in the experiment, which lasted approximately two hours, they were given a voucher.

Twenty-nine students, between 17 and 22 years of age, responded to the invitation. Sixteen females and 13 males, mostly undergraduate students of Communication. A pretest showed that 62% (N=18) of the students said they consume news frequently or very frequently; 79% (N=23) indicated they were interested or very interested in issues of historical memory; 86% (25) said they were not at all or not very familiar with the use of VR glasses. The 29 youth were randomly distributed into two groups:

- Experimental group (R1): the 17 subjects in this group received the stimulus: a VR journalistic content.
- Control group (R2): the 12 subjects were not exposed to VR; they consumed a multimedia story.

Stimulus

The journalistic story of the experimental stimulus was the 360° video reportage titled *Auschwitz, la lucha por preservar la memoria del horror* (Auschwitz, the struggle to preserve the memory of horror) (https://bit. ly/40ow2bQ). The video, produced by *El País* of Spain, is 5:30 minutes long and was published on YouTube VR on November 18, 2017. The journalistic story gives an account of the restoration process of the museum built in the Nazi concentration camps. The other material used, without VR, was a multimedia story titled the same way, combining electronic text and several color photographs, published on November 29 on the *El País* web portal (https://bit.ly/3TQuUvc).

Procedure

The experiment was conducted on September 13, 2022 in the two television studios of the Universidad de La Sabana, which have similar conditions. The laboratories are soundproofed against external noise, which creates an interference-free environment and recreates a natural media consumption environment. All participants were instructed on the purposes of the research. Students in the R1 experimental group watched the 360° video using Oculus Quest VR goggles in

the first study. The young people in the control group R2 simultaneously viewed the multimedia story on laptop screens set up in the second study. After being assigned to a group, the subjects had no contact to avoid contamination during the experimental exercise and data collection.

Independent and dependent variables

In this research, the independent variable (X) is the immersion degree, which is understood as "a form of awareness, the degree of which reflects the intensity of their cognitive, emotional, and sensory connection" with the journalistic content (Shin & Biocca, 2018, p. 2817). In the case of 360° video (observed with VR glasses), the depth of immersion is greater, while in multimedia reportage the degree of immersion is almost zero.

We generated eight constructs that served as dependent variables (Y), with internal validity of the variables and their corresponding measurement scales, since the constructs reached Cronbach's alpha coefficients above 0.60 and 0.70, which are considered scientifically acceptable values (van Griethuijsen et al., 2015). Only one of the scales (empathy) has alpha values below 0.60; however, we will report its results as they are of paramount interest for research and, in some cases, such value may be considered acceptable by some scholars (Pallant, 2020; Tuapanta et al., 2017).

Y1. *Knowledge*. This variable was measured with the five basic elements on which a news event is constructed (Wu, Cai, Luo, et al., 2021): what, who, how, where, and when (e.g., what objects of the victims did the Soviet soldiers find in the Auschwitz camps when they liberated them from Nazi rule?). The answers were operationalized dichotomously as Right or Wrong. However, Cronbach's alpha reliability test suggested considering only three of the questions and dispensing with two of them (who and how) (Cronbach's α=0.72; M=0.7; SD=0.3).

Y2. *Understanding*. The construct was comprised of four statements measured on a Likert scale of 1 to 5, where 1 meant strongly disagree and 5 meant strongly agree. The items were written based on the work of Hendriks and colleagues (2019), with some adaptations (e.g., I could easily follow the sequence or thread of events) (Cronbach α=0.75; M=3.9; SD=0.7).

Y3. *Content credibility*. Five items were measured with a Likert scale from 1 to 5 (e.g., The content of the news story was accurate). The statements were self-developed, based on Yale and colleagues' (2015) journalistic credibility studies (Cronbach α=0.71; M=4.1; SD=0.5).

Y4. *Enjoyment*. The construct included six statements from the work of Ibáñez-Sánchez and colleagues (2022) (e.g., The news story was fun). The items were evaluated with the same Likert scale from 1 to 5 (Cronbach α=0.77; M=4.0; SD=0.6).

Y5. *Empathy*. For this construct, three statements, rated on a Likert scale from 1 to 5, proposed by Archer and Finger (2018), were used, with researchers' own adjustments (e.g., I felt as if I was in the shoes of the Jews in Auschwitz) (Cronbach α=0.520; M= 4.3; SD=0.6).

Y6. *Emotional engagement*. On the one hand, we designed four items around negative emotions (sadness, fear, anger, and disgust) (e.g., When consuming the news story I felt sadness –sensation of losing something or someone) and, on the other, four other items were formulated for positive emotions (joy, acceptance, surprise, and hope) (e.g., When consuming the news story I felt joy –general feeling of wellbeing). On these last statements, the reliability test suggested eliminating those related to acceptance and hope. The construct was elaborated by the researchers inspired by Plutchik's (2001) theory of emotions. All statements were measured with a Likert scale from 1 to 5 (α=0.66; M=3.9; SD=0.7). For positive emotions, the Speraman and Brown test was applied for two items (SpearmanBrown=0.60; M=3.0; SD=1.1).

Y7. *Satisfaction*. The construct was measured with two statements based on Bhattacherjee (2001) and Shin and Biocca (2018) (e.g.: How well did the news story satisfy your initial expectations?). The items were rated on a Likert scale from 1 to 5, where 1 was totally dissatisfied and 5, totally satisfied (SpearmanBrown=0.80; M=4.2; SD=0.6).

Y8. *Continuity of use*. Two statements were used to measure this variable, based on the literature of Shin and Biocca (2018) and Ibáñez-Sánchez and colleagues (2022) (e.g., How likely would you be to continue to be exposed to similar news stories using technologies such as those employed today?). Items were rated on a Likert scale of 1 to 5, where 1 was very unlikely and 5, totally likely (Spearman-Brown=0.94; M=4.6; SD=0.7).

Data collection and processing

To collect the information resulting from the experiment, we used a survey (post-test) that grouped the different sets of questions agreed upon to inquire about the gratifications. The questionnaire was answered by the students by accessing an online form in Microsoft Forms. The results were imported into SPSS to run the analyses.

RESULTS

One of the purposes of communication studies focused on the effects of messages on audiences is to check whether or not people acquire knowledge about a specific topic after consuming an informative content. In this regard, this research shows that the members of the control group, exposed to the multimedia special, reported a higher degree of knowledge (M=0.86, SD=0.22) than the members of the experimental group, exposed to the VR story (M=0.59, SD=0.27). These differences between the two groups (experimental and control) were statistically significant after an analysis of variance [$t(27)=-2.82$, $p<0.01$]. Hypothesis 1, which stated that users exposed to immersive VR journalistic content would gain less knowledge than users consuming multimedia formats, proved to be true. On the contrary, the credibility of the information showed no difference between people who watched the multimedia special (M=4.07; SD=0.52) and the VR reportage (M=4.07; SD=0.58). H2 is thus rejected.

Emotional engagement, on the other hand, was different between members of one group and the other, even though it did not prove statistically significant. In fact, those participants who watched the VR story felt more negative emotions (M=4.08; SD=0.63) than those who consumed the multimedia special (M=3.72; SD=0.72) [$t(27)=-1.40$; $p>0.05$]. On the contrary, those who watched the multimedia special reported more positive emotional engagement (M=3.11; SD=1.12) than those exposed to the VR product (M=2.79; SD=1.17) [$t(27)=0.75$; $p>0.05$]. Thus, hypothesis 3 was rejected as it did not reach statistical significance.

Enjoyment is one of the gratifications obtained by audiences that arouses the interest of journalism researchers. In that regard, a *t*-test aimed at understanding the differences in the mean between the control and experimental groups showed that people who consumed the VR content reported a higher degree of enjoyment (M=4.26; SD=0.47) than those who were exposed to the multimedia special (M=3.66; SD=0.74), and those differences were statistically significant [$t(27)=2.666$; $p<.05$]. Thus, H4 is confirmed.

Regarding people's assessment of satisfaction with the expectation generated by the technology and content, the results show that students in the VR experimental group confirmed higher satisfaction (M=4.41; SD=0.56) than the young people who watched the multimedia special (M=4; SD=0.64). A t-test of variance validated H5 *[$t(27)=1.83$; $p<0.08$].*

Academic literature shows that satisfaction is directly related to and moves in the same direction as the intention to use the technology or consume similar content in the future. Indeed, this experiment corroborates a difference in the mean favoring the experimental group exposed to VR (M=4.76; SD=0.59) versus

those who viewed the multimedia special (M=4.37; SD=0.77), but further analysis of variance found that these differences in the mean were not significant [$t(27)=1.54$; $p>0.05$]. H6 is therefore partially confirmed.

Questions 1 and 2 inquired about the ability of VR journalism to positively reward audience understanding and empathy. In this regard, the research shows that although there are differences in the mean between the control group (M=4.08; SD=0.80) and the experimental group (M=3.73; SD=0.63) concerning the comprehension of the journalistic event, these disparities between the two groups are not statistically significant [$t(27)=-1.31$; $p>0.05$].

Finally, this research sought to understand whether empathy was a determinant variable in the consumption of information in VR formats. Counterintuitively, the differences found in the mean of the control group were higher (M=4.44; SD=0.5) than those reported by the experimental group exposed to VR (M=4.2; SD=0.73). A *t*-test revealed, however, that the differences between the two groups were not significant [$t(27)=-1.02$; $p>.05$].

DISCUSSION

The findings of this research on the decline in knowledge acquisition regarding news events recreated with VR are consistent with those of other scholars (Jeong et al., 2020; Sundar et al., 2017). Everything suggests that the amount of audiovisual stimuli offered by a 360° video, such as exploring the Auschwitz camps, detracts from the user's ability to absorb the key information about a news event, including the museum's restoration work. In fact, the so-called novelty effect of the technology may have played a role in the decreased knowledge (Greber et al., 2023) of the group, most of whom reported little or no familiarity with VR glasses. In contrast, multimedia formats combining text and photographs corresponded with traditional information assimilation. This finding is consistent with previous studies showing that those media or platforms that offer stories with linear and structured cognitive elements allow audiences to retain information more easily than those that employ psychedelia, multiplicity of stimuli, or multitasking (e.g., second screening).

In addition, no significant differences were found regarding the degree of credibility when the user consumes VR content compared to a multimedia special. This raises concern because the journalistic industry expects immersive narratives to be part of the solution to the problem of audience distrust in news information (Pérez Seijo & Vicente, 2022). Cognitive gratifications seem, then, not to be precisely those that are satisfied with the inclusion of 360° video in the journalistic record.

However, Pérez-Seijo and colleagues (2022) warn that the differential value of 360° video is not precisely to provide substantial information, but to offer the user the sensation of being transported to the place where the events took place. In this regard, and as Glasser (2000) also points out, the consumption of journalistic stories cannot be explained solely by rational motivations. Audiences, as challenging as it may sound, come to the news also for enjoyment. The results of the study support that postulate, as those who experienced the story in VR reported greater enjoyment than those who consumed the multimedia story. This is consistent with research that has proven that better immersion conditions lead to better enjoyment rates (Hendriks et al., 2019; Van Damme et al., 2019), and this is mediated or influenced by the presence or psychological sensation of being on the scene (Barreda-Angeles et al., 2020b; Hendriks et al., 2019).

While enjoyment seems to be an element of fiction and video games, studies in hybrid digital environments show that users value novel formats that allow them to easily understand complex ideas. For example, during the COVID-19 pandemic, online media and disinformation fact-checkers tried edutainment stories and graphic formats such as memes and short social videos to help citizens understand the importance of getting vaccinated in a fun way. VR journalism can become a technology that motivates users to seek pleasure while consuming immersive news, making journalism a complex pairing of utility-hedonism (Kim & Lee, 2022). VR opens avenues for further research on its potential as an informative tool, specifically in contexts such as Latin America, where social networks have a high penetration and audiences seem to have become used to the characteristics of the network.

Additionally, because of the nature of the 360° video selected for this experiment would seem to be contrary to the users' enjoyment itself, since it addressed the history of the Nazi concentration camps, and if this study found significant differences in the enjoyment of the VR piece versus the multimedia special on such a lurid subject matter, we predict that the user's experience of enjoyment is going to be much greater if the main theme of the piece is positive. A concern for Barreda-Angeles and colleagues (2020a) is that enjoyment may conflict with empathy due to the news topic being addressed. A painful event, in theory, such as what happened in Auschwitz, should not encourage hedonism, but empathy. However, it is quite possible that what triggered the user's enjoyment, understood as pleasure or escapism, was the spherical aesthetics of the 360° video or the opportunity to travel to the Nazi concentration camps. An idea that makes more sense when it is pointed out that, although without significant differences, people exposed to the VR story said they identified mostly with negative emotions (sadness,

fear, anger, and disgust), which is logical since the story narrates the thousands of murders and humiliations to which the Jews were victims.

Regarding emotional rewards and empathy, this research, like others (Wu, Cai, Luo, et al., 2021; Steinfeld, 2020), shows that the affective domain remains difficult to disentangle for journalism, as no statistically significant differences are identified between formats with different immersion degrees. This ratifies the value of quantitative-experimental exercises to verify and problematize the findings of qualitative research such as that of Nielsen and Sheets (2019) which, through focus groups, had established and affirmed that both emotions (positive or negative) and empathy were OGs of immersive journalism. One reason that may explain the difficulty in achieving definitive results on the affective benefits of VR news content is that they are conditioned by users' social and personal contexts and convictions (Shin & Biocca, 2018). The development of empathy and emotionality could be conditioned by cultural, geographical and time proximity. Being a special with a historical approach that recreates a distant moment in time and space, for young Colombians, empathy towards those who suffered the concentration camp would be affected by that distance.

At the beginning, we pointed out how important positivity in the U&G theory is for the audiences' feeling that media content offers an answer to their needs. In that regard, the results are equally consistent with the findings of Ibáñez-Sánchez and colleagues (2022): perceived enjoyment is a driver of satisfaction. This feeling of fulfillment will be fundamental in the future for the adoption and appropriation of VR in the journalistic field (Bujić, 2021). This process should be enriched by the users' intention to continue exposing themselves to VR stories and to recommend them to their acquaintances; however, this purpose did not clearly emerge in the research, perhaps not for lack of interest in the type of immersive storytelling but because, after story consumption, the subject matter may, again, have proved culturally and geographically distant for the students who integrated the experiment.

CONCLUSIONS AND RECOMMENDATIONS

At the beginning of the paper we stressed, following the previous guidelines of Sundar and Limperos (2013), that each new technology, such as VR, stimulates the shaping of a unique gratification package. We hope to have contributed to this field with this research, knowing that much systematic study of audiences is still needed to further investigate whether immersive journalistic content really fits their communication needs (Watson, 2017) or sought gratifications (GS) and to solve the question asked by Nielsen and Sheets (2019) on whether or not

users perceive an added informational value in VR compared to other traditional information formats.

This study is relevant because it shows how enjoyment and satisfaction are gratifications obtained (OG) by users that could generate a greater engagement of audiences towards journalistic and documentary stories, in an era of information overabundance, in which the currency of exchange turns out to be the attention of users and in which the avoidance of information for reasons of overload and pressures on mental health is growing, as reported by various studies of digital consumption (Newman et al., 2023).

On the other hand, there is the challenge for these immersive technologies (VR, AR and mixed, for example) and for newsrooms (and their professionals) on how to replace the potential of text and multimedia when teaching/illustrating about journalistic facts. Indeed, this research shows the limitation in knowledge acquisition with VR journalistic products and what happens with the next cognitive process –comprehension– is unclear. It may be that, as users become more familiar with immersive devices over time, knowledge and comprehension improve. Consideration should also be given to how virtual products are being designed from the narrative and the informational and sensory load they provide, and how this blocks the natural cognitive processes that people execute when it comes to more complex thinking tasks.

This research was exclusively focused on OGs, but it is fundamental to advance in the study of these rewards in dialogue with the GSs. The aim is to verify what coherences and discrepancies exist between what audiences expect from VR news content, prior to immersing themselves in it, and the actual rewards they get after enjoying the technology. Moreover, the gratifications offered to the user by VR on account of its own technological affordances (Sundar & Limperos, 2013) could also be analyzed (Sundar & Limperos, 2013).

Finally, these research results should be interpreted with caution. They have the limitation of having been obtained after experimenting with only a few people, although there is no compulsory number recommended by methodologists in scientific experiments. Similarly, the experiment was conducted with university students; their age and interests could have influenced why enjoyment gratification performed better than for example, comprehension and credibility variables. The topic of the story used as a stimulus may also have played a role; this will have to be varied in future research.

FUNDING

This paper was written as part of the research project COMPHD-22-2023 *El periodismo de realidad virtual como posible potenciador de las facultades cognitivas, emocionales y conductuales de las audiencias* (Virtual reality journalism as a possible enhancer of the cognitive, emotional, and behavioral faculties of audiences), attached to the Journalism Research Group (GIP, by its Spanish acronym) and the Research Center for Digital Technology and Society of the School of Communication. The project was funded by the Universidad de La Sabana.

REFERENCES

Aitamurto, T., Aymerich-Franch, L., Saldivar, J., Kircos, C., Sadeghi, Y., & Sakshuwong, S. (2020). Examining augmented reality in journalism: Presence, knowledge gain, and perceived visual authenticity. *New Media and Society*, *24*(6), 1–22. https://doi.org/10.1177/1461444820951925

Archer, G. & Finger, K. (2018). *Walking in another's virtual shoes: Do 360-Degree Video News Stories Generate Empathy in Viewers?* Columbia Journalism School. https://academiccommons.columbia.edu/doi/10.7916/D8669W5C

Baía, A., Kick, L., & Oliveto, M. (2023). Main concepts in immersive journalism: Immersion and presence. In A. L. Sánchez (Ed.), *Insights on Immersive Journalism* (pp. 92–104). Taylor & Francis.

Barnidge, M., Sherrill, L.-A., Kim, B., Cooks, E., Deavours, D., Viehouser, M., Broussard, R., & Zhang, J. (2021). The Effects of Virtual Reality News on Learning about Climate Change. *Mass Communication and Society*, *25*(1), 1–24. https://doi.org/10.1080/15205436.2021.1925300

Barreda-Ángeles, M., Aleix-Guillaume, S., & Pereda-Baños, A. (2020a). An "Empathy Machine" or a "Just-for-the-Fun-of-It" Machine? Effects of Immersion in Nonfiction 360-Video Stories on Empathy and Enjoyment. *Cyberpsychology, Behavior, and Social Networking*, *23*(10), 683–688. https://doi.org/10.1089/cyber.2019.0665

Barreda-Ángeles, M., Aleix-Guillaume, S., & Pereda-Baños, A. (2020b). 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. https://doi.org/10.1080/03637751.2020.1803496

Bhattacherjee, A. (2001). Understanding Information Systems Continuance: An Expectation-Confirmation Model. *MIS Quarterly*, *25*(3), 351–370. https://doi.org/https://doi.org/10.2307/3250921

Bujić, M. (2021). *Immersive Persuasiveness. Investigating media effects of 360-degree immersive journalism* (Academic dissertation, Tampere University). https://trepo.tuni.fi/handle/10024/135612

Da Costa, L. & Brasil, A. (2017). Virtual reality: Technical and narrative innovation in immersive journalism. *Contemporânea Revista de Comunicação e Cultura*, *15*(1), 141–161. https://periodicos.ufba.br/index.php/contemporaneaposcom/article/view/21417

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*, *23*(2), 479–498. https://doi.org/10.1177/1464884920922006

De la Peña, N., Weil, P., Sanchez-Vives, M. V., Slater, M., Llobera, J., Giannopoulos, E., Pomés, A., & Spanlang, B. (2010). Immersive Journalism: Immersive Virtual Reality for the First-Person Experience of News. *Presence: Teleoperators and Virtual Environments*, *19*(4), 291–301. https://doi.org/10.1162/PRES_a_00005

Domínguez-Martín, E. (2015). Periodismo inmersivo o cómo la realidad virtual y el videojuego influyen en la interfaz e interactividad del relato de actualidad (Immersive journalism or how virtual reality and video games are influencing the interface and the interactivity of news storytelling). *Profesional De La Información*, *24*(4), 413. https://doi.org/10.3145/epi.2015.jul.08

Glasser, T. L. (2000). The Politics of Public Journalism. *Journalism Studies*, *1*(4), 683–686. https://doi.org/10.1080/146167000441385

Greber, H., Aaldering, L., & Lecheler, S. (2023). The Worthwhileness of Immersive Journalism—Taking on an Audience Perspective. *Journalism Practice*. https://doi.org/10.1080/17512786.2023.2177711

Hendriks, 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. https://doi.org/10.1016/j.chb.2018.09.018

Ibáñez-Sánchez, S., Orús, C., & Flavián, C. (2022). Augmented reality filters on social media. Analyzing the drivers of playability based on uses and gratifications theory. *Psychology and Marketing*, *39*(3), 559–578. https://doi.org/10.1002/mar.21639

Janssen, J. H. (2012). A three-component framework for empathic technologies to augment human interaction. *Journal on Multimodal User Interfaces*, *6*, 143–161. https://doi.org/10.1007/s12193-012-0097-5

Jeong, S.-H., Kim, S., Yum, J. Y., & Hwang, Y. (2020). Effects of virtual reality news on knowledge gain and news attitudes. *International Journal of Mobile Communications*, *18*(3), 300-313. https://doi.org/10.1504/ijmc.2020.107098

Katz, E., Blumler, J. G., & Gurevitch, M. (1973). Uses and Gratifications Research. *Public Opinion Quarterly*, *37*(4), 509–523. https://doi.org/10.1086/268109

Kim, Y. & Lee, H. (2022). User acceptance of 360-degree video news: an integrated model of extended TAM and U&G perspectives. *Communication Research and Practice*, *8*(4), 327–346. https://doi.org/10.1080/22041451.2022.2141861

Kim, M. J., Lee, C. K., & Preis, M. W. (2020). The impact of innovation and gratification on authentic experience, subjective well-being, and behavioral intention in tourism virtual reality: The moderating role of technology readiness. *Telematics and Informatics*, *49*, 101349. https://doi.org/10.1016/j.tele.2020.101349

Kovach, B., & Rosenstiel, T. (2012). *Los elementos del periodismo* (The Elements of Journalism). Aguilar.

Liou, D. K., Hsu, L. C., & Chih, W. H. (2015). Understanding broadband television users' continuance intention to use. *Industrial Management and Data Systems*, *115*(2), 210–234. https://doi.org/10.1108/IMDS-07-2014-0223

Maschio, T. (2021). *Digital Cultures, Lived Stories and Virtual Reality*. Routledge. https://doi.org/10.4324/9781003037316

McQuail, D. (1984). With the benefit of hindsinht: Reflections on Uses and Gratification research. *Critical Studies in Mass Communication*, *1*(2), 177–193. https://doi.org/10.1080/15295038409360028

Metaverse may be $800 billion market, next tech platform (2021, December 01). *Bloomberg*. https://www.bloomberg.com/professional/blog/metaverse-may-be-800-billion-market-next-tech-platform/

Metzger, M. J., Flanagin, A. J., Eyal, K., Lemus, D. R., & Mccann, R. M. (2003). Credibility for the 21st Century: Integrating Perspectives on Source, Message, and Media Credibility in the Contemporary Media Environment. *Annals of the International Communication Association*, *27*(1), 293–335. https://doi.org/10.1080/23808985.2003.11679029

Mundhenke, F. (2022). Body Epistemes. First-Person Narration and Body Awareness in Nonfictional Virtual Reality. *Interactive Film & Media Journal*, *2*(4), 114–121. https://doi.org/10.32920/ifmj.v2i4.1689

Myers, D. G. (2004). *Psychology* (7th ed.). Worth Publishers.

Newman, N. (2022). Digital News Report: Journalism, Media, and Technology Trends and Predictions 2021. https://reutersinstitute.politics.ox.ac.uk/sites/default/files/2022-01/Newman - Trends and Predictions 2022 FINAL.pdf

Newman, N., Fletcher, R., Robertson, C. T., Eddy, K., & Kleis- Nielsen, R. (2023). *Digital News Report 2023*. https://reutersinstitute.politics.ox.ac.uk/sites/default/files/2023-06/Digital_News_Report_2023.pdf

Nielsen, S. L. & Sheets, P. (2019). Virtual hype meets reality: Users' perception of immersive journalism. *Journalism*, *22*(10), 2637–2653. https://doi.org/10.1177/1464884919869399

Paíno, A. & Rodríguez, M.-I. (2019). Proposal for a new communicative model in immersive journalism. *Journalism*, *22*(10), 2600–2617. https://doi.org/10.1177/1464884919869710

Pallant, J. (2020). *Spss Survival Manual* (7th ed.). Taylor & Francis.

Palmgreen, P. & Rayburn, J. D. (1979). Uses and Gratifications and Exposure to Public Television: A Discrepancy Approach. *Communication Research*, *6*(2), 155–179. https://doi.org/https://doi.org/10.1177/009365027900600203

Pérez, K. & Hernández, J. E. (2014). Aprendizaje y comprensión. Una mirada desde las humanidades (Learning and comprehension. A glance from the humanities). *Humanidades Médicas*, *14*(3), 699–709. https://humanidadesmedicas.sld.cu/index.php/hm/article/view/650

Pérez-Seijo, S. (2023). Periodismo inmersivo con vídeo 360 grados: valor, narrativa y retos de futuro (360-degree immersive journalism: its value, narrative, and future challenges). *Doxa Comunicación. Revista Interdisciplinar De Estudios De Comunicación Y Ciencias Sociales*, (37), 385–400. https://doi.org/10.31921/doxacom.n37a1841

Pérez-Seijo, S., Benítez, M. J., & Baía, A. (2022). Immersed in the news. How VR and 360-degree video have triggered a shift in journalistic storytelling. In B. García-Orosa, S. Pérez-Seijo, & Á. Vizoso (Eds.), *Emerging Practices in the Age of Automated Digital Journalism* (pp. 67–77). https://doi.org/10.4324/9781003260813-7

Pérez-Seijo, S. & Vicente, P. N. (2022). After the Hype: How Hi-Tech Is Reshaping Journalism. In J. Vázquez-Herrero, A. Silva-Rodríguez, M. C. Negreira-Rey, C. Toural-Bran, & X. López-García (Eds.), *Total Journalism. Studies in Big Data* (pp. 41–52). https://doi.org/10.1007/978-3-030-88028-6_4

Plutchik, R. (2001). The Nature of Emotions: Human emotions have deep evolutionary roots, a fact that may explain their complexity and provide tools for clinical practice. *American Scientist*, *89*(4), 344–350. https://www.jstor.org/stable/27857503

Rauschnabel, P. A. (2018). Virtually enhancing the real world with holograms: An exploration of expected gratifications of using augmented reality smart glasses. *Psychology and Marketing*, *35*(8), 557–572. https://doi.org/10.1002/mar.21106

Ruggiero, T. E. (2000). Uses and Gratifications Theory in the 21st Century. *Refining Milestone Mass Communications Theories for the 21st Century*, *3*(1), 3–37. https://doi.org/10.1207/S15327825MCS0301_02

Sánchez Laws, A. L. (2020). Can Immersive Journalism Enhance Empathy? *Digital Journalism*, *8*(2), 213–228. https://doi.org/10.1080/21670811.2017.1389286

Shin, D.-H., & Biocca, F. (2018). Exploring immersive experience in journalism. *New Media and Society*, *20*(8), 2800–2823. https://doi.org/10.1177/1461444817733133

Steed, A., Pan, Y., Watson, Z., & Slater, M. (2018). "We Wait"-The Impact of Character Responsiveness and Self Embodiment on Presence and Interest in an Immersive News Experience. *Frontiers Robotics AI*, *5*, 112. https://doi.org/10.3389/frobt.2018.00112

Steinfeld, N. (2020). To Be there when it Happened: Immersive Journalism, Empathy, and Opinion on Sexual Harassment. *Journalism Practice*, *14*(2), 240–258. https://doi.org/10.1080/17512786.2019.1704842

Sundar, 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

Sundar, S. S., & Limperos, A. (2013). Uses and Grats 2.0: New Gratifications for New Media. *Journal of Broadcasting and Electronic Media*, *57*(4), 504–525. https://doi.org/10.1080/08838151.2013.845827

Tuapanta, J., Duque, M., & Mena, Á. (2017). Alfa de Cronbach para validar un instrumento de uso de TIC en docentes universitarios (Cronbach's alpha to validate a questionnaire of ICT use in university teachers). *Revista MktDescubre*, (10), 37–48. http://dspace.espoch.edu.ec/handle/123456789/9807

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 Griethuijsen, R., van Eijck, M. W., Haste, H., den Brok, P. J., Skinner, N. C., Mansour, N., Savran, A., & BouJaoude, S. (2015). Global Patterns in Students' Views of Science and Interest in Science. *Research in Science Education*, *45*, 581–603. https://doi.org/10.1007/s11165-014-9438-6

Vázquez-Herrero, J. & Sirkkunen, E. (2022). Regreso a Fukushima: percepciones y efectos de una historia de periodismo inmersivo (Back to Fukushima: Perceptions and effects of an immersive journalism story). *Profesional De La Información*, *31*(1). https://doi.org/10.3145/epi.2022.ene.08

Venkatesh, V. (2000). Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model. Information systems research, 11(4), 342-365. https://doi.org/10.1287/isre.11.4.342.11872

Vorderer, P., Park, D. W., & Lutz, S. (2020). A history of media effects research traditions. In M. B. Oliver, A. A. Raney, & J. Bryant (Eds.), *Media Effects. Advances in Theory and Research* (4th ed.) (pp. 1–15). Taylor & Francis.

Watson, Z. (2017). *VR for news: The new reality?* Reuters Institute.

Wu, H., Cai, T., Liu, Y., Luo, D., & Zhang, Z. (2021). Design and development of an immersive virtual reality news application: a case study of the SARS event. *Multimedia Tools and Applications*, *80*, 2773–2796. https://doi.org/10.1007/s11042-020-09863-w

Wu, H., Cai, T., Luo, D., Liu, Y., & Zhang, Z. (2021). Immersive virtual reality news: A study of user experience and media effects. *International Journal of Human Computer Studies*, *147*, 102576. https://doi.org/10.1016/j.ijhcs.2020.102576

Yale, R. N., Jensen, J. D., Carcioppolo, N., Sun, Y., & Liu, M. (2015). Examining First- and Second-Order Factor Structures for News Credibility. *Communication Methods and Measures*, *9*(3), 152–169. https://doi.org/10.1080/19312458.2015.1061652

Yang, S. (2023). Sentiment and Storytelling: What Affect User Experience and Communication Effectiveness in Virtual Environments? *Journalism and Media*, *4*(1), 30–41. https://doi.org/10.3390/journalmedia4010003

ABOUT THE AUTHORS

JUAN CAMILO HERNÁNDEZ-RODRÍGUEZ, assistant professor and Ph.D. candidate in Communication at Universidad de La Sabana. He holds a master's degree in Journalism and Digital Communication from the same institution. He researches on audiences and disinformation, and on the intersection between journalistic narratives, emerging technologies (virtual reality), and neurosciences.

https://orcid.org/0000-0002-1524-6885

VÍCTOR GARCÍA-PERDOMO, full professor at the Universidad de La Sabana. Ph.D. in Journalism and Communication, holds a master in Latin American Studies from the University of Texas, Austin, USA. He researches on the impact of digital technologies on the media, journalism, and the audience.

https://orcid.org/0000-0002-7187-1618