



ORIGINAL CONTRIBUTION

How Audience can be Engaged in VR Videos; A Critical Analysis of Sense of Presence, Enjoyment and Empathy

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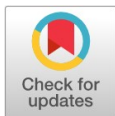
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Abstract— Audience engagement has become a priority in the news industry. Journalists and news producers are adopting innovative ways of storytelling that can engage more and more audiences. For this, the producers and directors are using 360 VR technologies to boost audience engagement. However, there is scarce empirical evidence in underdeveloped countries on the relationship between 360 VR videos and audience engagement. Therefore, the study aimed to find out which element, including the sense of presence, enjoyment, and empathy, is more effective for audience engagement. For this experimental method was employed. Purposefully volunteers were recruited, and a 360 VR video taken from the website “The New York Times” named “The Displaced was shown to them. Their responses were collected on the pre-structured questionnaires. The findings showed that a sense of presence is very vital for audience engagement as the more audience “feel being there” in the 360 VR video, they will be engaged more similarly, the role of enjoyment and empathy is also very important in 360 VR videos. These three elements might be considered as the foundation of the 360 VR video industry. Therefore, the producers and the technology experts can get benefit from these results. It also contributes to the scarcity of 360 VR literature particularly. There is very limited empirical evidence on the relationship of sense of presence, enjoyment, and empathy with audience engagement in underdeveloped countries like Pakistan as this technology is in the very early stage.

Index Terms— Audience engagement, VR 360 video, Sense of presence, Enjoyment, Empathy

Received: 13 June 2021 **Accepted:** 25 August 2021; **Published:** 08 October 2021



Introduction

Virtual Reality (VR) has been evolving as an innovative reality in modern news and media. It offers motion, sound, and an effectual milieu that transmit users into a new reality. This novel reality has a momentous impact on user engagement. Therefore, media agencies have been adapting to this ground-breaking technology incessantly. With more user engagement, more avenues of growth can be unlocked.

Numerous theories have been offered to explain immersion and engagement. It includes flow and presence. According to Cummings, Rawhouser, Vismara, and Hamilton (2020), engagement is possible by making users feel ‘presence’ or the ‘sense of being there. With a sense of ‘being there,’ winning attention, focus, and perception of an individual is possible. On user engagement, Tribusean and Reality (2020) suggested that 360-degree clips and videos increase user engagement by enhancing their level of immersion and presence. This, in turns, helps raise the extent of their perceived enjoyment of watching the videos. Green (2008) revealed that narrative transportation impacts one’s belief and persuasion, which also enhances interest. Likewise, research conducted on motivation levels and decision-making

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showed that engagement level that is effectively integrated with behavior, feedback, and judgment cycles can boost self-confidence, a will to hard work, and persistence for beginners. As virtual reality is on expansion, it raises the question on how user engagement can be improved.

A study by Nielsen et al. (2016) informed that the level of enjoyment and sense of presence is the major contributing agents for higher user engagement. To this stance, Castaneda, Bindman, Cechony, Sidhu, and Environments (2018) added that empathy is also a core element in increasing user engagement. However, there are very few studies that reveal the effects of 360 VR news videos on audience engagement. Therefore, due to the scarcity of empirical pieces of evidence in the literature regarding the relationship of sense of presence, enjoyment, and empathy, it has become a dire need of the time to do deeply insight investigation of this phenomenon. For that reason, this study investigated the effectiveness of these elements with audience engagement. In addition, this study employed the theory of Transportation, which says that if you are traveled virtually or mentally drawn into a reality, your attitude and actions reflect that content or video. So, it is very important to know that is the reflection of the story comes in engagement with the content. This study provides ample evidences for the association of feeling "being there" and audience engagement.

Kukkakorpi and Pantti (2021), on the other hand argued that there is a myriad of interest points available on virtual reality videos using cinematography. Another aspect presented by Yilmaz and Goktas (2017) found that a higher focus level and exploring personal space and points helps determine information clues to its audience and concludes better user engagement. It has been argued that Head-Mounted Displays (HMDs) with stereoscopic features offer comprehensive immersion and thus augments user engagement.

On defining user engagement, Lee, Lewis, and Powers (2014) and Couldry, Fotopoulou, and Dickens (2016) said that it is a link between users and the news content. Chang and Cohen (2017) however, found that there have been limitations found in virtual reality movies that can negatively impact on user engagement. The researches on the influence of virtual reality clips on audience have not been 100 percent predictable or comprehensible to date. This drawback raises many questions. Therefore, the following are the objectives of the study:

Research Objectives

1. To find out the relationship between 360 VR news videos and audience engagement.
2. To investigate the effectiveness of sense of presence, enjoyment, and empathy on audience engagement in 360 VR news videos.

Literature Review

The research finds a relationship among empathy, enjoyment, user engagement, and sense of presence. In past studies, the relationships between these aspects are argued differently. The quality of audience experience is known as user engagement. It is referred to as users' positive response to technology. User engagement boosts a better understanding of user experience in watching 360-degree virtual reality clips. Studies showed that 360-degree movies motivate users to vigorously engage with content. Researchers commonly debate that two key features, motion sickness and sense of presence determine user engagement with 360-degree clips. Presence is the degree to which users feel they are at a particular place even when they are not. 360-degree clips boost presence by presenting a spherical viewing area and forming a natural visual experience. Also, it enhances the feeling of realism and authenticity of viewing experience. By permitting users to move their views and look around anywhere, 360-degree clips form a first-person view of a situation or event that boosts presence. Shin (2018) found that higher presence can heighten pleasure; empathy in the virtual content, and by doing so, virtual journalists can attain desired results. Indeed, immersive virtual reality often evokes the concept of presence. Schwind, Knierim, Haas, and Henze (2019) argued that there exists a strong association between immersion and presence. Users with a higher sense of presence have a greater chance of feeling more connected in immersive environments. As per the theory of presence Suh, Wang, Gu, and Wagner (2018), any technology that supports higher levels of audience presence (i.e., a sense of being there) raises motivation levels and higher focus. Presence is an immersive phenomenon, and it is strongly associated with positive emotions of joy, playfulness, fun, and pleasure. It boosts user participation in activities such as reviewing, analyzing, and positioning in virtual reality videos. Although literature revealed two types of definitions of presence, there is consensus on a state that transports user into 'elsewhere' through virtual reality. Myriad of theories have been placed on the importance of the 'complete detachment' from the physical world. As per Biocca, Kim, and Levy (1995), presence in VR is the farewell from the 'actual world' and the 'entrance' into the virtual world. Another research by Zahorik and Jenison (1998) postulated that the sense of presence could be felt when a user responds to the computer-generated environment similar to their response to the real world. User engagement is similar to the presence and a form of consciousness, the one that grabs audience attention and makes users feel more involved through a piece of multimedia. Therefore, user engagement can be described as the quality of audience experience that depends upon different factors, such as novelty, aesthetic appeal, system usability, attention, and involvement of the user. Besides, it is also the analysis of the user experience in general. Herbelin, Vexo, and Thalmann (2002) described the Virtual reality as a computer-generated process which leads to its users to feel into a new reality, called immersion. Immersion mostly calls out through its most common feature,

“sense of presence Borger, Costera Meijer, van Hoof, and Sanders (2013) feeling of “being there” subjectively. According to the Ijsselsteijn and Riva (2003), a sense of presence in the complex mental phenomenon which has the strong links with emotional activities, which are not only restricted to virtual reality but also book reading, watching video clips, and talking on cell phone leads to generate the sense of presence. Whereas Mestre, Fuchs, Berthoz, and Vercher (2006) argued that computer-generated images and video cause to transfer its users from the real world to ‘present’ in a virtual environment, which is the central notion of virtual reality. Different researches have proposed examination of the role of presence this is why the first hypothesis of this study

H1: There is a positive relationship between sense of presence and audience engagement.

Zahorik and Jenison (1998) pointed out that sense of presence is key element for the virtual environment. Riva argued that development role of presence is a control of agency. Whereas Freeman et al. (2003) suggested that it is natural for a person to find a connection between his activity, his internal state, and his sensory perception of what is happening there. Wankel (1993) explained enjoyment as a positive emotion. Another definition of enjoyment by Vorderer, Klimmt, and Ritterfeld (2004) was the pleasure feeling by the media user’s while experiencing certain media. Enjoyment is an important element in immersive videos as Coleman and Ross (2010) and Borger et al. (2013) reveal that audience enjoyment is valued high in quality journalism therefore, the second hypothesis of this study is

H2: There is a positive relationship between enjoyment and audience engagement.

Sanchez et al. (2017) unearthed that sense of presence, enjoyment, and empathy play a very significant role in the audience engagement. Jorland and Thiriox (2008) and Andrejevic, Volcic, and Critique (2020) initiated the concept of empathy. They described how we can be connected to nature at an emotional level. Sánchez Laws (2020) concluded that the pledge of empathy oriented and immersive moral journalism is very thrilling as one can visualize a future of immersive journalism where we can be able to not only watch but also connect in remote events with our full body and it may allow us to act and help the victims. Based on this literature third hypothesis of this study is

H3: There is a positive relationship between empathy and audience engagement.

Though the elements in the VR 360 videos including sense of presence, enjoyment and empathy are very important yet the association among them and their effects on each other and on the audience engagement are limited therefore this study is a little attempt to answer it.

Theoretical Framework

The core purpose of the study has been predictable. It strives to analyze the influence of virtual reality videos on user engagement. The virtual reality audience is transported into a virtual world. According to M. C. Green, Brock, and Kaufman (2004), the user might feel lost in the story due to transportation from the real world to virtual reality. Therefore, the core variables for this study have been presence, empathy, and enjoyment. These are explained in the Transportation Theory by Green et al. (2004), Green (2008) which declares the inclination of consumers to travel or mentally fly into the reality. Murphy, Frank, Chatterjee, and Baezconde-Garbanati (2013) stated that frequent transportation in the content makes users adopt implied behaviors, attitudes, and beliefs. The narration portrays a particular event; however, VR audience tends to take a more generic message and applies it on their daily life. This fact has been established and found true for a number of topics such as consumer products, health, and social issues etcetera. Moreover, Dillard, Ferrer, Welch, and health (2018) showed that transportation might happen across different media forums. For instance, users can be transmitted into another world through book stories, movies, narrations, and virtual reality. However, researches do not prove there is a consistent beneficial from any particular media.

As per Green (2008), the content effectiveness in a certain format to another mainly depends upon the individualistic differences between users. Compared to the print version, Walter, Murphy, Frank, and Baezconde-Garbanati (2017) suggested that the video version of stories create higher levels of cognitive and emotional involvement and a higher resistance as well.

In Dillard et al. (2018) view that “Transportation effects work through reducing counter arguing, creating connections (identification and liking) with characters and increasing perceptions of realism and emotional involvement,” The transportation theory presented the procedure and revealed that it occurs when the user ‘mental systems and capacities’ engrosses into the displayed set of events in a narrative. This theory emphasizes the importance of the traditional literary texts and printed words. Also, it proposes that the virtual reality videos are also impactful. Blevins, Stephens, Abrantes, and Misuse (2017) elucidated that transformation on preliminary prospect or performance perception is known as a change in ‘Attitude’. Rejection of substitutions and selection of particular items with increasing the consonant state of mind is called ‘Individual Preferences’.

This phenomenon was explained by Zhang, Liang, and Wang (2016) as when individuals are on seeking mode, they prudently want to reconfirm information through their decisions on different avenues, such as promotional advertisement and word-of-mouth, etcetera.

Couldry et al. (2016); Lee et al. (2014) defined user engagement. They said it is the association between the news content and the users. On the other hand, Chang and Cohen (2017) showed that inadequacies and limitations also exist in virtual reality videos that may impact audience engagement.

Methodology

Method and Sample

An experimental designed approach was used to answer the hypothesis. Purposefully 180 undergraduate students of Pakistani universities were selected who gave their voluntary consent for the experiment. Out of which 96 were male participants, and 84 were female. A 360-degree VR video content was selected from the website “The New York Times” named “The Displaced.” The duration of this video is 11:08 minutes. Pre-structured questionnaire was used to obtain the responses of the participants. Adapted scale of sense of presence developed by (Witmer & Singer, 1998), similarly adapted scale of enjoyment developed by (Kendzierski, DeCarlo, & psychology, 1991); for empathy adapted scale of (Lawrence, Shaw, Baker, Baron-Cohen, & David, 2004) and for an audience, management adapted scale of (O'Brien, Toms, & Technology, 2010) were employed to measure the audience engagement. The Pearson correlation technique is used on the SPSS version 26.

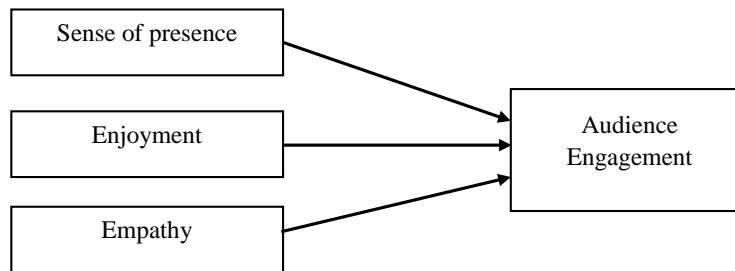


Fig. 1. Research Model

Sense of presence, enjoyment, empathy are the independent variables, and audience engagement is the dependent variable.

Findings and Discussion

Table I
Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	96	53.3	53.3	53.3
Female	84	46.7	46.7	100.0
Total	180	100.0	100.0	

In the current study, a total of 180 responses were used, whereas 10 were exploitable. University undergraduate students were the respondents, with 96 males (53%) and 84 females (47%) in the study.

Table II
Correlations

	Sense of Presence	Enjoyment	Empathy	Audience Engagement
Sense of Presence	1			
Enjoyment	.736**	1		
Empathy	.543**	.381**	1	
Audience engagement	.701**	.605**	.587**	1

** Correlation is significant at the 0.01 level (2-tailed)

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Results show that there is a positive relationship between sense of presence and audience engagement (.701). Similarly, the correlation between enjoyment (.605) followed by empathy (.587) show a positive relationship with audience engagement.

Table III
Regression

Hy	IV	DV	R Square	F	B	t	Sig
H1	Sense of Presence				.386	4.813	.000
H2	Enjoyment	Audience Engagement	.571	78.126	.207	2.838	.000
H3	Empathy				.299	5.075	.000

Table III shows the regression results concerning hypothesis H1, H2, and H3. *F*-test results ($F = 78.126$) proved that the model is good for regression. Beta value indicates that there is a positive relationship between a sense of presence with audience engagement ($\beta = .386, p < 0.00$). The value of *t* ($t = 4.813, p < 0.00$) is satisfactory to support the H1. Similarly, there is a positive relationship between enjoyment with audience engagement ($\beta = .207, p < 0.00$), and the empathy value ($\beta = .299, p < 0.00$) also indicates a positive relationship with audience engagement. Values of *t* for enjoyment ($t = 2.838, p < 0.00$) and empathy ($t = 5.075, p < 0.00$) show H2 and H3 are supported and accepted.

Discussion

The participants experienced a very new technology this is why the results of the study are significant. Previous studies showed that the sense of presence has been very vital for the audience engagement similarly, this study validates as the value of the co-relationship between the sense of presence and audience engagement (.701). This study contributes to the literature that a sense of presence is a very important factor as after the experiment, the participants were very excited and, in their responses, they authenticated that they felt being a presence in the video, which induced them to watch the video till the end. In a related study, same findings were found by Wang, Gu, and Suh (2018) that the VR videos enhance a sense of presence that boosts up the audience engagement. The second element of VR videos was enjoyment that has also validated by the results of this study, and the correlation between enjoyment and audience engagement is (.605). These findings reinforce the theory of media enjoyment presented by Green et al. (2004) that, explains that consumer who enjoy the media they would like to be engaged in media in prospect too. Enjoyment is an important factor as Coleman and Ross (2010) and Borger et al. (2013) unearth that audience enjoyment is valued high in quality journalism therefore, this element cannot be ignored in VR journalism. In another study, Sanchez et al. (2017) have stressed that the increase in audience’s sense of presence, enjoyment, and empathy will increase audience engagement. Empathy was also an important element of this study therefore, the results of this factor substantiate the conclusion of Sanchez et al. (2017) immersive journalism is a novel form to comprehend the news in a more insightful manner. Gonzalez-Liencre, Shamay-Tsoory, Brüne, and Reviews (2013) state that Empathy is a motivational driver for action therefore, immersive journalism cannot survive without of this. The outcome of this study can be supposed that for the better audience engagement, the VR videos must be bountiful more sense of presence, enjoyment, and empathy.

Implications

The results of this study contribute to the literature as the relationship and effectiveness of the basic three elements i.e., sense of presence, enjoyment, empathy show significant results hence validating the theory used for the study. 360 VR technology is new in underdeveloped countries, particularly in Pakistan; few news organizations are making 360 VR videos, thus enabling the producers, technology experts, and industry owners to employ these results when making decisions about 360 VR news videos.

Conclusion

With the mushroom growth of private news channels in underdeveloped countries, particularly in Pakistan, the owners and producers of the news media are leaving no stone unturned to engage the maximum audience as they consider it a key to earning money with expensive advertisements. Therefore, they are also trying to utilize 360 VR technology for their future plans. As 360 VR news videos, therefore, provide the enhanced sense of presence, causing enjoyment and helping the understanding of the difficult content, it was the core need of the time to investigate the impact of these elements. This study concludes that 360 VR journalism is on the verge of the next venture therefore those who adopt this technology meaningfully will not be defeated in the future of journalism. This study is only confined to the undergraduate students of the media department of the universities from the twin cities of Rawalpindi/Islamabad Pakistan. Future studies can be conducted in which the participants could be taken from the field of 360 VR technology and industry as well as the journalists so that there can be more intelligibility in the effectiveness of impressiveness and audience engagement.

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