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IMMERSIVE-NEUROCOMMUNICATIVE NARRATIVES: FROM AUDIOVISUAL TO AI THROUGH VIDEO GAMES

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ABSTRACT

Abstract in English. 150 words maximum. This article reviews the evolution of neurocommunication and its impact on immersive narratives, from traditional audiovisual media to artificial intelligence (AI) and video games. Virtual reality (VR), augmented reality (AR), and mixed reality (MR) technologies have significantly enriched screen-mediated communication while enhancing empathy and understanding in education, entertainment, and therapy. Although these technologies pose technological and ethical challenges, their ability to generate empathy and deep understanding is remarkable. Video games have introduced interactivity. Technology cannot by itself induce the state of flow and acceptance of information that immersive narratives pursue, but it can facilitate the neurological and psychological conditions for the audience's immersion in the message and experience. In conclusion, the psychological basis of neurocommunication will continue to impact the way humans perceive AI-mediated communication and immersive storytelling in fiction and journalism.

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1. Introduction

An exemplary case is pre-World War I Germany, where Kaiser Wilhelm II adopted various broadly different approaches to the study of communication, especially relevant due to technological and social advances. Although its recent significance is due to these factors, its principles can be applied to the interpretation of historical communicative phenomena where neuroscience was not consciously foreseen. A striking example is political communication, where prejudice and stigmatization of minorities have been exploited to gain or maintain power. This manifests itself in color selection for political movements and the manipulation of facts to create narratives favorable to political personalities. An exemplary case is pre-World War I Germany, where Kaiser Wilhelm II adopted various traits while in public to gain support from different segments of the population (Sturmer *et al*., 2003). In this context, stagings were created for newsreels showing parades and ceremonies, representing an early effort to segment audiences and create specific messages.

Today, the modernization of communication has been consolidated thanks to Information and Communication Technologies (ICT). This evolution began with personal computers and cell phones, followed by Internet 2.0 and 3.0, as well as the revolution of tablets and smart devices (Aladro Vico, 2020). Currently, we are witnessing the irruption of artificial intelligences (AI), which could represent the most significant paradigm shift in the history of ICT (Teran Haughey, 2022). Video games have been both the gateway to these ICT and one of the first mechanisms adopted for AI research. Since games in early versions of Windows, they have played pedagogical roles in new technologies, acting as a means to become familiar with interfaces. As chess computers have developed (Sood, 2022), the term "Artificial Intelligence" has been used to refer to binary-random decision systems, less complex than those expected to work with in the future (Risi & Preuss, 2020). This development has been driven by the demand from gamers to face real challenges, rather than predictable algorithms. A significant example is the "AI" in the game *Command & Conquer* (Westwood Studios, 1995), which received a constant economic advantage over the human player to be competitive. Subsequently, the industry displaced this approach with the proliferation of multiplayer titles, leaving it to human rivals to create the challenge (Raith *et al*., 2021). AI has a crucial relationship with video games, as it has transformed the gaming experience from its earliest days to the present day. It is primarily used to create complex behaviors in non-player characters (NPCs), improve immersion, personalize experiences, and increase realism in virtual worlds.

NPCs are one of the most visible elements in video games that use AI. These computer-controlled characters interact with players in a believable and dynamic way. The AI defines its behavior, making decisions in real time, adapting to the player's actions and offering richer gameplay.

- Reactive AI: In many video games, NPCs are programmed with basic algorithms that allow them to react to simple stimuli, such as detecting the player, attacking, fleeing or hiding.
- Adaptive AI: In more advanced games, NPCs can adapt to the player's playing style, modifying their behavior according to the strategies used by the player.

AI is also used to create virtual worlds or levels automatically using procedural algorithms, allowing new and unique content to be generated in each game. Games like No Man’s Sky or Minecraft use AI to create massive, detailed worlds without every detail having been designed manually.

The AI can generate missions adapted to the player's progress, maintaining interest by always offering new challenges and objectives.

The industry has worked to develop programs, interfaces and narratives that captivate audiences through sensory and emotional stimuli. This has manifested itself in the use of vivid colors, improved graphics, digital and classic soundtracks, and the introduction of new formats and innovative game mechanics. In addition, there has been a constant quest to create believable open worlds, within the boundaries set by *Stanley's Parable* (Beyvers, 2020). *Stanley's Parable* (Ruh *et al*., 2014) is an interactive drama that plays with the narrator and the apparent freedom of the player, reflecting the limited influence of the user's actions on the outcome of the story. The story is there to be discovered, more as a witness than as a co-creator, a common factor in many games considered interactive dramas.

The immersive narrative is a characteristic of the digital entertainment medium or the video game, as it has been the aim of other audiovisual media according to the technical limitations of each moment. From the cannons as instruments in the 1812 overture, to the train accelerating towards the Lumière's camera, and even the attempts of surround sound and 3D image for cinema and television, are advances that can be traced to the attempt to keep the viewer sensorially isolated from the outside. Creating in

him the sensation of being a direct witness and quasi-participant of the action. What the video game as a medium contributes to this immersion is interactivity. Which, again in application of Stanley's parable: for all sensation of freedom within the digital medium is fundamentally fictitious. The player is but a spectator from whom actions are required for the story to continue. Regardless sometimes of the order or degree of their completion.

Indeed, this quest to provide sensory stimulation has come a long and fruitful way, from the 1970s to the current implementation of effort-based learning mechanisms (García, 2021). Sensory stimulation refers to any type of stimulation that activates the body's senses, such as touch, sight, hearing, taste, and smell. This stimulation is essential for cognitive and emotional development, especially in the early stages of life, but remains relevant throughout adult life.

In neurological terms, sensory stimulation occurs when the body's sensory receptors (such as cells in the skin, eyes, or ears) detect stimuli and send signals to the brain for processing. This processing allows the perception of sensations such as heat, pressure, sound or smell.

Different types can be listed:

- Tactile: Involves the sense of touch and refers to sensations such as temperature, pressure or pain. It may include contact with different textures and temperatures.
- Auditory: Related to the sense of hearing. Sounds and vibrations activate the auditory system and can have effects on the emotional or mental state.
- Visual: Refers to the perception of images, colors, shapes and lights. Visual stimulation can have a significant impact on mood and concentration.
- Olfactory: The sense of smell can be stimulated by odors and fragrances. Smell is closely linked to memory and emotions.
- Gustative: Related to taste, this stimulation comes from the interaction with food and drinks, which activate receptors on the tongue to perceive flavors.
- Proprioceptive: It involves the perception of one's own body in space, allowing one to feel the position and movement of the extremities.
- Vestibular: Related to balance and movement control, based on the information the brain receives from the inner ear.

Sensory stimulation is key to cognitive, emotional and physical development, especially in babies and young children. Lack of adequate stimulation can lead to problems in the development of the nervous system. For example, early physical contact helps strengthen emotional bonds and develop greater emotional security.

For adults, sensory stimulation remains important as it can affect mental well-being, improve mood, and promote relaxation or concentration.

Sensory stimulation is closely related to neurocommunication, which refers to the study of how the brain processes and responds to communication and environmental stimuli, especially in the context of human interaction.

Relationship between sensory stimulation and neurocommunication:

- Sensory processing and communication: neurocommunication studies how the brain interprets and responds to the stimuli it receives, whether through language, images, sounds or the physical environment. Sensory stimulation provides the necessary input for the brain to decode and react to those stimuli. For example:
- Auditory: The ear captures sound waves (words, tones of voice), and the brain processes these signals to interpret them as communication messages.
- Visual: The brain interprets images, gestures, facial expressions or colors, which are part of non-verbal communication.
- Impact on message perception: Different sensory stimuli influence how a message is received, understood and remembered. For example, in advertising or marketing, visual, sound and tactile stimuli are used to impact the way the brain processes and remembers a message. Neurocommunication investigates how certain stimuli (such as colors or sounds) can influence a person's decisions and emotions when receiving information.
- The emotional response: The brain not only processes information rationally, but also emotionally. Sensory stimulation can generate automatic emotional responses. For example, a relaxing sound can create calm, while a bright light can cause alertness. Neurocommunication studies how sensory

stimulation triggers these emotional responses and how they affect social interaction and communication.

- Multisensory experience: In modern communication, multisensory stimulation (using several senses at once) is used to create more immersive and effective experiences. Neurocommunication explores how the combination of visual, auditory and tactile stimuli, for example, can improve the capture of a message or an idea, taking advantage of how the brain integrates information from different sensory sources.

In the field of marketing, neurocommunication uses principles of sensory stimulation to influence consumer perceptions. The use of pleasant sounds, colors that evoke positive emotions, or textures that generate pleasant sensations in products or sales environments can modify the way a person processes information and, consequently, affects their purchasing decision. Therefore, neurocommunication relies on sensory stimulation to understand how the brain responds to the stimuli that are part of the communication processes and how this influences human decisions, emotions and behaviors (Barrientos-Báez, 2024).

2. Objectives

The aim is to establish a previous analysis to determine, first of all, whether the intention of creating an immersive narrative has been present since the beginning of audiovisual communication, having evolved with the media until the present moment of appearance and empowerment of AI as a form of human-machine interaction, and as a generator and definer of content for such narratives. The video game represents the most advanced and capable form of realizing this historical vision given its interactive characteristics and its audience acceptance. But especially for its suitability in terms of neurocommunication. The above-mentioned study should be used as a basis for identifying the current position of immersive narrative within the global field of communication, which is increasingly mediated by more complex and widespread technologies. Thus, it will be possible to direct research efforts in these fields to benefit society as a whole.

3. Methodology

A comprehensive review of the scientific and industry literature will be conducted to gather scientific and historical data on neuroscience and its interrelationship with the video game industry. Factors, both intentional and accidental, that, based on neurocommunication principles, have contributed to the success of these media among their specific audiences will be examined. The review will also include data on the evolution of immersive narratives and the way in which they have been tried to be implemented at any given time with the available technology and concepts.

To this end, a thorough search of sources will be conducted, including monographs, scientific articles, websites, specialized or niche publications, as well as academic texts relevant to the subject in hand. The relevance of these sources will be determined by the quality of the publications, the completeness of their content and their relevance to address certain preliminary questions that are necessary to advance the first sections of the paper.

The result of this work will be a complete and comprehensive understanding that will provide researchers in the field with a foundation to ask and answer new questions using more advanced methodologies. This is done in a context where the relevance of the studied medium has increased, possibly surpassing sectors of academia due to the well-known generation gap. This paper therefore seeks to bridge the gap between traditional academic research and contemporary advances concerning the convergence of neuroscience and the video game industry.

4. Results

Immersive communication has emerged as a fascinating and rapidly developing field, combining technology, communication and psychology. Using technologies such as virtual reality (VR), augmented reality (AR), and mixed reality (MR), this approach creates significantly richer experiences than traditional screen-mediated interactions (Slater & Wilbur, 1997; Steuer, 1992). In recent years, research has advanced the understanding and application of these technologies for a variety of purposes, from education and training to entertainment and therapy. For example, a study by Ahn and Bailenson (2013)

demonstrated that immersive VR experiences can enhance empathy by allowing users to "walk in another person's shoes".

AR has been used in education, where AR-enriched teaching materials can increase student motivation and engagement, improving understanding of complex concepts (Billinghurst *et al*., 2001; Rampolla & Kipper, 2012). MR, which combines real and virtual elements, has revolutionized fields such as medicine, allowing surgeons to benefit from real-time visualizations during surgical procedures, improving accuracy and outcomes for patients (Satava, 2003).

Despite these advances, there are technological and practical challenges to implementing immersive communication, such as accessibility issues, the need for specialized hardware, and concerns about the long-term effects on mental and physical health (Minsky, 1980). In addition, the digital divide can widen existing inequalities (Warschauer, 2003). The importance of immersive narratives lies in their ability to generate empathy and deep understanding, immersing users in experiences that traditional media cannot offer, transforming education, training, entertainment and journalism (Antón-Bravo & Serrano Tellería, 2021; Bonfim *et al*., 2023).

In education, immersive narratives can take students through time and space, allowing them to explore different periods of time and places, improving knowledge retention by experiencing lessons firsthand (Aguirre Roque *et al*., 2023). In entertainment, these narratives allow users to influence the story and become part of it, creating personalized and satisfying experiences, a characteristic shared with electronic entertainment (Riva *et al*., 2024). Immersive journalism offers a powerful tool for telling real stories, taking viewers to inaccessible places and situations, fostering a deeper and more empathetic understanding of global issues (de Bruin *et al*., 2022).

However, immersive narratives also imply significant responsibilities for their creators, derived from the ethical and psychological impacts of these experiences. Immersive narratives, at the neurocommunicative level, increase the extent and impact of a message because, neurocommunication is essentially dedicated to discovering which stimuli trigger specific reactions in the brain, being a theoretical guide rather than an achievable goal in practice (Kiran & Prabhakar, 2021).

Historically, printed newspapers allowed readers to visualize international events and conflicts. These detailed accounts provided tools for imagining events, known as reader immersion. This technique was developed by American journalists in the 1960s, who offered extensive and descriptive reporting to immerse the reader in the narrative universe (Pérez-Seijo & López García, 2019; Ramírez, 2022). Radio, and later film and television newscasts, continued this tradition of immersion, using scripting techniques, music and image selection to convey the desired message, the first of this type of content generator in Spain being TVE's *Informe Semanal* program (Balsebre Torroja & Fernández-Sande, 2021; Etura Hernández, 2021).

The video game, on the other hand, represents a significant advance by introducing interactivity into the process. Although in this regard, as early as the 1940s, in Japan, animated films invited viewers to sing along with karaoke shown on screen. *The Rocky Horror Picture Show* (1975) is an example of interactive cinema, where the audience actively participates. The first recognized interactive feature film is *Kinoautomat* (1967) by Radúz Cincera, which introduced a pioneering interaction with the audience.

The evolution of the video game has been constant, seeking to involve the user in more complete sensory experiences. This development has been driven by innovations in graphics technology. The "Doom" series was a pioneer in adopting 3D technology to generate immersive environments, an approach replicated in contemporary games such as *Wolfenstein* and *Rise of the Triad* (Goldberg & Flegal, 1982). Virtual reality, being championed by Meta's Metaverse project, promises even greater immersion, although its mass adoption still faces economic and technological challenges (Vera Ocete *et al*., 2015).

The release of endorphins while playing the game can influence the player's motivation and contentment. This flow state is characterized by total focus on the activity, making time seem to pass quickly (Khan, 2017; Klasen *et al*., 2013). In 2023, the democratization of AI allows the general public to create varied content, from text to images and animations. This has its precedents in the democratization of opinion and dissemination of text over the Internet (Alonso González, 2021; Barrientos-Báez *et al*., 2021; Barrientos-Báez *et al*., 2022).

The ability to create content using AI enables the dissemination of post-truth in networks, allowing the editing of reality to fit personal desires, which weakens adherence to truth (Caerols *et al*., 2020). The psychological basis of neurocommunication will continue to impact the way humans perceive AI-mediated communication and immersive storytelling in fiction and journalism.

5. Discussion

The achievement of truly immersive narratives is a technological and conceptual race (Minsky, 1980; Steuer, 1992; Slater & Wilbur, 1997; Süngü, 2023; Vera Ocete *et al*., 2015;) in which technical advances are less important than the very ability to build in the prosumer user the capacity and desire to get involved in the narrative, usually through interaction (Beckhusen, 2012). Meanwhile, though VR is at a significant technological level, it still needs to be implemented and developed. For a start, it implies the lower cost of the devices and the consent to less privacy in the home. More primitive immersive resources, such as immersive reading, are far from being useless today (Murray, 1999; Robson & Costa, 2016; Ryan, 2004). And it is a fact that the techniques of one medium have always matched the environment of its successor (Balsebre Torroja & Fernández-Sande, 2021; Pérez-Seijo & López García, 2020).

The achievement of complicity with the audience, of a growing interactivity, is the type of immersiveness that modern media allow. Ironically, this may be more real in cases such as those cited by Etura Hernández (2021) in which the audience is required to be able to read between lines and read double meanings in a priori unidirectional content, than in the modern medium of video games (Beyvers, 2020). The idea of interactivity whether real or rather illusory, aims to involve the user in the process of being informed or receiving the messages and stimuli provided. This creates firstly a more personalized message for each audience, and secondly, a sense of co-authorship of the experience that makes the user more receptive and confident with respect to such stimuli (Herrero Herrero, 2016, Liu, 2024; Zabala Cía *et al*., 2022). Or what Khan (2017) and Klasen *et al*. (2013) call "flow state" that state of complete focus and dedication to the activity, or what is of the case: to the message, to the experience being conveyed. It is to induce this state that graphic technology has been gradually improving, in a commercial as well as technological and psychological race: playing with the suspension of disbelief of the audience, and at the same time seeking to make it work less and less (Goldberg & Flegal, 1982; Oltra, 2020). Creating or relying on technologies that have then been adapted to the creation of content for news and journalistic purposes: improving the accuracy and ease of creation of infographics in press and television, the definition of images, the quality of digitally enhanced sound, etc. All these technological improvements have been added to traditional journalism to the point of giving birth to the concept of immersive journalism (Caerols *et al*., 2020). This concept is still pending to be outlined, with experiments being carried out mainly on 360º videos (Cardona *et al*., 2023) and an abundance of theories on how the metaverse idea could influence it, if it materializes (Vera Ocete *et al*., 2015).

It is the field of video games that has brought the broadest and most fruitful base of experimentation in this regard (Süngü, 2023). It provides examples of the kind of immersion sought by the audience in the narrative. Also, there is a relatively marginal need for technologies as opposed to pure narrative in order to achieve this result.

However, today's context poses an additional challenge coming from the technological field, and that is the generalization of AI-based applications and, therefore, the popularization of textual and artistic creation in terms of simplification. Alonso González (2021), Barrientos-Báez *et al*. (2021) and Barrientos-Báez *et al.* (2022) point to the way journalistic information is still adapting to the realization of the post-truth fact, only to be hit now by the technological industry bringing to the masses tools that allow to create with little effort images that act as fallacious verifiers of false stories. Following the same principle of resource images and forcing us to reevaluate the way people consume and create informational content. Aïmeur *et al*. (2023) timely point out the capabilities of AI to counteract itself in this sense: moving the technological race from having its goal in the imitation of reality, to putting it in the determination of reality. AI, in any case, is already irreversibly imbricated in communication processes and in the training of future communicators (Peña Fernández *et al*., 2021; Zúñiga *et al*., 2023).

6. Conclusions

The achievement Technology facilitates human functions, and immersive narratives, such as virtual reality, promise almost literal immersion. However, there is a risk in relying exclusively on technological means, neglecting the narrative. Technology has proven vital in suspending the audience's disbelief, bringing them into a flow state and full engagement with the message. A believable graphic environment, coupled with an exciting sound environment, can draw the viewer into the action and make them want to be part of it, whether in a documentary, a television production or a virtual metaverse.

Today, society is still adapting to the skepticism necessary to deal with the immediacy of technology in communication and how this immediacy is treated by various sectors of the public. The post-truth era has shown that, as Terry Pratchett (2004) said, "a lie can go around the world before the truth has had time to lace up its boots" (p. 29). This reality is due to the tendency of immersive narratives to match the public's prejudices, making them more easily believed. Thus, the West reexamines popular works of fiction that validated now-offensive stereotypes, such as "Tintin in Congo," Disney films akin to the Confederate lost cause, and the James Bond franchise.

Despite efforts to remove these biases in popular narratives, raising awareness in society is complicated. Consumption of information and journalistic narratives is linked to individual preferences, which include these biases. Media choice depends on the unconscious desire to confirm preconceptions. The ability to create content through AI enables the spread of post-truth in networks, allowing editing reality to fit personal desires. This weakens society's adherence to truth, driving it toward a "dictatorship of feeling" where belief trumps verifiable facts.

Even with a cultural shift toward a more honest relationship with the public sphere, manipulation of the truth will persist as long as there are groups determined to deceive. The same technological tools can counteract hoaxes, but the problem of relativizing objective reality still remains. The psychological basis of neurocommunication will continue to impact the way humans perceive AI-mediated communication and immersive storytelling in fiction and journalism. In any human conflict, truth is the first casualty due to psychological, technological and social factors.

Technology alone cannot induce the information flow and acceptance state that immersive narratives pursue. Its function is to facilitate the neurological and psychological conditions for the immersion of the audience in the message and experience. In journalistic narratives, immersion provides credibility and assimilation of the message. Perhaps credibility is the only thing left to save when reality becomes editable. The credibility of the message is fundamental in any form of communication, whether in marketing, politics, education, or everyday interactions. Credibility is linked to the trust that the receiver has in the information they receive and in the source that transmits it, and largely determines whether the message will be accepted, believed and remembered.

In the information age, digital credibility has become a challenge due to the large number of information sources available. Fake news, overinformation and social media algorithms complicate the verification of the authenticity of messages. Therefore, it is crucial that companies, media outlets and organizations maintain a strong transparency and fact-checking strategy to ensure their messages are perceived as credible.

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