

IMAGE DEVICES, IMMERSION AND SYNESTHESIA

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ABSTRACT

Blurring the frontiers between the real world and imagery, images increasingly lose their limits, becoming windows onto enhanced sensory experiences, through synesthetic immersion. Through the complex neurobiological circuitry and processing of the human visual system, images allow widening the world known to men. Images allow travelling to many worlds. Improved to enhance the viewer's synesthetic immersion, images are increasingly designed to stimulate the senses. From stone carved still images to 4D multimedia contents with tailored sensory effects, technology allowed improving mankind's viewing experience. With the increasing use of localization devices, media resources tend to integrate narratives from different mobile platforms, promoting an intense immersion, new forms of information treatment and ultimately, meaningful experiences.

Keywords: visual art, image perception; vision; synesthesia; immersion; experience.

1. INTRODUCTION

Synesthesia is a perceptual phenomenon of mixed sensations. The perception of a shape, may induce a perception in the same modality, such as a color, and may also elicit a sensation in another modality, such as hearing. In other words, stimulus to one sensory modality, such as vision, may involuntarily trigger experiences through other senses. With the help of the different kinds of image devices and technologies developed over time, vision magnifies the observer's synesthetic immersion. Regardless of mimicking reality or not, images are able to capture the viewer. They instigate the senses through virtual worlds that are apparently as able to be sensed as the 'real' one. It may be said that images allow virtual travelling in time and space, despite general relativity or quantum mechanics (Billings 2014).

Ultimately, through technological devices that are part of our daily lives and extend virtual and physical spaces, we are only able to perceive the world as a continuum because there is a complex neurobiological interaction between the senses. Images clear the paths onto other

worlds that seem to extend ours infinitely. Screens become media where images come to life and increasingly resemble ourselves and our objects.

2. SENSES AND IMAGES

Improved to enhance the viewer's synesthetic immersion, images have been increasingly designed with the purpose of stimulating the senses. Similarly, the level of immersion increases according to the sort of visual contact established with an image through the various modalities: optical, haptic, or both (synesthetic). From the ancient Greek, synesthesia concerns the relationship between the senses, the synthesis of different sensory modalities, such as light, sound, temperature, texture, taste, pressure, or smell. Synesthetic vision is based on the relationship between different sensory systems, making them work together, simultaneously. This can trigger sight, hearing, touch, synesthetic experiences, or a sense of internal movements of the body providing the observer's immersion in the world of the image.

Through logical reasoning, Aristotle argues that because it is closer to the brain, vision is closer to logic and reason. Considering visual literacy as the competence to read and interpret visual communication, images emerge as a stimulus that triggers a reaction from a mental process.

The visual sensory system begins at the most elementary level of processing perceived perceptual information. Visual perception is also a relationship with memory and emotion. The contact with an object tends to be stored in memory, becoming a memory object/ tangible memory (Hoffman and Dick, 1976). Images increasingly become bridges between us and the world. Our own perception of reality changes according to the notion of intermediaries between us and the world, between us and images. Our perception also changes, depending on the media, sensed as a membrane between the world and the viewer.

Marshall McLuhan (1999) advocates the separation of the senses in the communication process coincided with the invention of the movable type by Gutenberg. It allowed the large-scale production of print works, privileging natural or verbal language, and in general the visual sense, as never before. The process of knowledge communication and dissemination was performed mainly through visual stimuli than through other stimuli.

Images activate optical perception, resembling reality, eluding the receiver through a sense of touch, not just from the eye-sight, but through the whole body. Through visual messages, along with memory, it is possible to remember and imagine. When previously experienced and felt, the sense of touch is also activated. Ultimately, eye-sight reveals what touch, taste, smell and hearing already know (Pallasmaa, 2005).

Long before vision, touch convokes us to enter the image, although we don't realize it. When we look at an image, we remember what we perceived and felt before. And the more real it is, the more our memory is stimulated to retrieve from touch the sensation caused by what we are watching. Tactile sight is always based on memory (also tactile).

This happens because we are also built of memories of images that experience makes us retrieve (Joly, 1999). This emphasizes that our field of perception is not limited to direct perception. It is (almost) always perception through devices (Lellouche, 2004). Media screen disapprove eye-sight as the sense that reunites both worlds (real and imagistic). They select touch as the mediator between those worlds; as the computer or cell phone with which we interact through our fingers.

As a tool of visual perception, the *Camera Obscura* was the result of a long process of discoveries and scientific developments. Since the 17th century, the vision of reality was gradually released by scientific developments. The *Camera Obscura* was a pioneering feat in the history of cinematic modes of perception because through optical techniques it introduced a restructuring of possibilities for visual experience (Grau, 2007).

3. SYNESTHETIC VISION AND IMMERSION DEVICES

Visual devices refer us to the approach between the sight of the observer and image. The *Panorama* is an example of this: a device allowing the immersion into image; not only through eye-sight, but through the whole body. The word 'panorama' derives from the Greek, meaning total vision.

Designed by Robert Barker in 1787, the *Panorama* consisted of a large round canvas screen lit from above; the distance between the canvas and the spectators should be carefully established so they couldn't see above the canvas. It created a perception-changing environment, making the spectators feel the sensations they would feel in the real place. The inventor was interested in perception, identifying the canvas with an embracing whole.

The purpose of the *Panorama* was to produce the illusion of another space, becoming the perfect replacement for reality in the 18th century, according to Bernard Comment (1999). It proved to be an immersive technology presenting the world as nonstop, transparent entertainment. With respect to immersion this can be defined as conveying the observer to the world of images.

3.1 Maréorama and Sensorama

The Maréorama was an attempt to appeal to the senses and allow new experiences through the different sensory systems. Created by Hugo Alesi and presented at the Universal Exhibition in

Paris in 1900, the Maréorama conveyed tactile and visual sensations to the observers, especially sensations of movement and time. These devices also marked the switch between analog and digital immersion. Henceforth, devices generated computational images – digital, hence virtual. An example of this is the Sensorama developed in 1950, by Morton Heilig.

The Sensorama represents the passage of the analog virtual imagery world onto a digital virtual imagery world. This device used film loops, stereoscopic vision, sounds, smells and other effects in order to create the illusion of a stroll. The audience was also subject to vibrations and odors simulated by chemicals. Although the device was not interactive, it could mobilize four or five senses: sitting in an imaginary motorcycle, travelling at full speed, the spectator could see the streets of Manhattan, hear the traffic on the streets, smell the burnt gasoline and street food, and feel the vibrations from the road (Barbosa, 2015).

Through multimodal technology, the purpose was a multisensory imagery experience (Grau, 2007). The Sensorama embodied an immersive virtual experience and allowed the user a ‘telepresence’ experience. When using this virtual reality machine, the users experienced an immersion into a computer-mediated environment, shutting out the awareness of the outside environment, creating a feeling of ‘being there’ in the mediated virtual environment (Lau et al., 2013). These two devices – the Mareorama and the Sensorama – inaugurated what became known as virtual reality. They promised the viewer an immersion in other worlds through the stimulation of the perceptual senses. The more synaesthetic, the more real would seem the world of the image. In fact, according to Oliver Grau (2007), the more synaesthetic is the perceptual experience of the observer, the less the world generated from a painting or a computer will seem a construction. This author claims that approximately since 1980 computers could create the suggestive impression that someone immerses in the space of the image, moving inside the image and interacting with it in real time, being able to intervene creatively.

3.2 HMD & CAVE

Head-Mounted Display (HMD) and Cave Automatic Virtual Environment (CAVE) devices generate the feeling of reality. HMD devices consist of a virtual helmet, placing images right in front of the observer, through two minicams, providing a three-dimensional world. However, not only HMD devices offer such involvement with images. The CAVE device is a cube where all six surfaces may be used as projection screens, circling the visitor (s) with an imagistic environment.

This 3D immersion system is considered the more immiscible in virtual reality. More than with the HMD, with CAVE the observer has freedom of movement, and although the physical space is greatly reduced, through various technologies it is digitally presented as a much larger simulated

space than through any other device. The observer can explore and interact with images of objects and/or virtual people, becoming himself image. Therefore, these devices reflect the fact that today, through them, while real we also become images. These worlds of [more or less] 'make believe' seem to give life to images by copying the real or making the utopian, palpable and sensitive. These 'new worlds', mainly due to the invention of the computer, reflect artificial worlds where we feel immersed, although always aware they are merely imagistic.

Currently, through many devices, images are present anywhere we look at. They are increasingly multiplied and placed in albums, reproduced in newspapers, exposed upon walls or printed in books, becoming ubiquitous. To be inside the image is the sensation of diving in it, through all the perceptual senses. It is the transparent presentation of the medium; the disappearing of the image frame/window and the subsequent approach of two seemingly different worlds. To be immersed is to be in the image space, embodying it, with the desire to be inside instead of outside, being part of it. According to John Berger (1972), more than windows opening to worlds, images are vaults where the visible is deposited. The transition between the plain tactile and visual stimulation of the observer and the synesthetic stimulation of the whole body of the observer.

The Maréorama and other similar attractions presented in the exhibition tried to make the audience live through wondrous experiences by putting them through an 'épatante' adventure.

4. SORTS OF IMMERSION

Although some of the principles of immersion were present in analog imaging devices, their widespread use was due to the implementation of digital devices. Currently, immersion causes the screen, display or monitor to disappear, filling the visual field of the observer and giving him the ability to act in another space, in which he finds himself, where the two spaces coincide, the physical space and the virtual space simulated by images.

The virtual space, also confined to a screen, can completely obliterate the real space. The screen disappears and a new relationship is established between the body of the observer and the observed image (Manovich, 2001). Immersion liberates the viewer from reality, traveling to the virtual world. The image presents itself as a space that is not over 'there', allowing above all a transposition.

Through immersion, the border between the real world and imagery ceases to exist. The observer is displaced to another dimension of the viewed image. Immersion allows the viewer/user an emotional involvement and physical experience of the image. The image is no longer an object of contemplation and exploration for the eyes. According to Lévy (2000), in the virtual world, images become windows to plunge all the perceptual senses.

On the other hand, according to Grau (2007), immersion is characterized by a decrease of critical distance and increase of emotional engagement. This author considers the immersive experience a time-space arena, where mental models or constructs are explored by the user sympathetically, and the physical and the virtual planes intersect, mutually influencing each other.

This interaction enhances the development of spatial narratives. In fact, it allows a wide range of recreational and social opportunities, providing a fertile field for new forms of socialization and new social organizations.

The author Dominic Arsenault (2005) classifies the immersion experience in three different ways¹: sensory, systemic, and fictional. Table 1 shows a proposition for different sorts/types of immersion.

Table 1: Sorts of Immersion

<i>Sensory immersion</i>	<i>Systemic Immersion</i>	<i>Fictional Immersion</i>	<i>Synesthetic Immersion</i>
<i>Stimulation of the senses in the experience of the fictional world through technical tools.</i>	<i>Stimulation of the senses through a system of rules governing a fictional reality.</i>	<i>Stimulation of the senses through the subject's involvement with the story, construing the sense of plot, formulating hypotheses about the outcome and assigning motivations to the characters.</i>	<i>Stimulation of the senses at the level of recreational experiences for the public, where the fictional realities are able to create recreational synergies and generate life experience environments.</i>

Source: Data adapted from Curralo, year of publication.

Note: Arsenault's model was initially devised to study immersion in video games, subsequently becoming a model for audiovisual and interactive immersion.

Sensory immersion focuses the stimuli of the senses in the experience of the fictional world. This is a dimension where technical tools are drawn up for a greater consistency and/or veracity of the construed world, including sensory stimulation of sight and touch. The 'fourth wall' is located in this most superficial and apparent layer of the immersion process; an expression from the theater

context, referring to the invisible wall separating and uniting the stage and the audience (Murray, 1997).

Systemic immersion refers to the acceptance of a system of elementary rules governing a fictional reality, allowing the cognitive involvement with the operation mechanics of the fictional world and the knowledge of the rules of this environment to make the experience more intense. Systemic immersion happens by involvement with the abstract system of complex fictional worlds, involving a whole repertoire of stories and characters inhabiting those worlds. Fictional immersion addresses the subject's involvement with the story in a construction work of the sense of the plot, formulating hypotheses about the outcome and assigning motivations to the characters (Arsenault, 2005). The immersion is formulated as the expectation of the individual to know what happens in the end of the narrative, projecting emotionally in the events narrated through a relation of empathy with the characters.

These sorts of immersion help to understand the surrounded elements and the process of involvement of the individual in fictional realities.

The fourth immersion is synesthetic immersion. Synesthetic immersion allows different levels of recreational experiences, where fictional realities are able to create synergies and generate environments for life experiences.

Synesthetic immersion thus concerns attributing features to the image that may stimulate the senses, providing a total environment adding to the mental involvement of the observer, to his own immersion. In this immersion, representation gives way to an interactive visualization of a model, whereas resemblance is subsequent to simulation, as advocated by Levy (1997). Synesthetic immersion translates the paradigm of audiovisual entertainment in the context of media convergence. This convergence may be understood as a platform for new world views and engagements, dimming the frontiers between fictional reality and actual reality.

4.1 Immersion and Ubiquity

In addition to the rapprochement of fictional and real reality, synaesthetic immersion is surrounded by ubiquity. Ubiquity may be defined as something that surrounds us constantly, equating images and language (Berger, 1996). Ubiquity is the quality of what is or may be placed in several places at the same time (omnipresence). It is related to the dilution of the frontier between observers and images; through it, images become worldly (real), and imagery devices become transparent, allowing the immersion of the observer.

In the early days of the internet, the sensory experience was considered a product of cognitive involvement, space structuring and user performance. In the new narrative architecture of the

perceptual world, user experience models relate to a complex system of recreational experiences based on technology. When technology becomes transparent or invisible, it is involved in daily lives until they are indistinguishable from daily lives themselves. In addition to making the image transparent in our perception, the medium becomes invisible, with no interference between the observer and the image and making possible the act of immersion of the observer (Weiser, 1991).

In the mobile context, transmediatic narrative disseminates and aggregates information linked to fictional reality, whereas locative media or location-based media bring people and places together, creating fluid spaces and immersive areas. These qualities point to new forms of recreational experiences that expand the meaning of immersion, in which the physical space is incorporated as a new dimension of fiction, not just as a reference or representation, but also as the object of action. Encouraging new forms of social interaction, image viewing is organized in layers and allocated by locative media, allowing the creation of stories for low cost mobile platforms, in a feedback mechanism linked to new topics and disseminated in the media ecosystem.

5. CONCLUSION

Mobile technologies assure constant, permanent connectivity. This mobility is responsible for changing spaces, triggering hybrid spaces – social spaces characterized by mobility. Digital devices such as Smartphones and Tablets, with video camera and location software promote disruption and the staging of a virtual reality show, allowing other forms of communication connecting spaces, contents and users. The ‘telepresence’ allowed by these devices is synesthetic in addition to real, retrieving sensations and conveying them to the viewers, allowing them to feel and live what they visualize, synthesizing the experience between the real and the virtual world.

In these mobile devices, images open the way to another world that seems to extend our world infinitely. However, it still retrieves the window/frame nature, becoming a screen where images come to life, and increasingly seem like us and our objects, moving like us. Today, through screens, there is a constant exchange between worlds, available upon different sorts of media and different variations. These different media open spaces that seem to complement our own space, allowing us to merge onto new sites using simple windows, permanently open, allowing a wide range of possibilities.

The truth is that at home or anywhere else, the miniaturization and portability of the media allows being in different places at the same time: the place of the body and the place of the image. For that reason, it is possible to emerge through the almost complete immobilization of

the body: through images that appear in cascade on a screen, in a constant on/off act allowed by these recent media, alternating places.

Last generation mobile devices connect people to local stories, allowing almost instant fictional realities that can be integrated with other platforms. Through access to the internet, users connect to a fictional reality that stems from the physical and the virtual world. The increasing use of localization resources tends to integrate narratives from different mobile media platforms, promoting more intensive immersion media, promoting experiences and new forms of treatment of information.

This supports the thesis of Marshall McLuhan that we live in a sort of global village, where everything is so available that we feel we can be here and there at the same time. In other words, the speed of access and transmission of information through the different media allows more time and space. Time that seems to expand and space that seems to compress and allow reducing distances. In this context, we live constantly between windows of media that allow us to experience several worlds: a screen connected to a network becomes a window through which we can be in place a thousands of kilometres away (Manovich, 2001).

The immersion of the observer in the image, through the stimulation of the senses, is simultaneous to the evolution of the different media, specially the screen, the most obvious medium in blurring the frontiers between the real world and imagery, fading the limits of the image. However, the interaction is done with the body almost totally immobile, unlike with the ancient *Panorama*.

Despite the disappearance of the limits of the image, and unlike what happened with the earlier devices, new technological devices are increasingly distant from our reality, offering completely different realities, although, as analysed here, instinctively tactile and above all synesthetic.

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