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Immersion

Immersion describes the absorption in an alternative world created through digital or traditional media, in particular as axiomatic feature of virtual reality (VR)

Immersion beschreibt das Eintauchen in eine durch digitale oder traditionelle Medien geschaffene, alternative Welt, insbesondere als wesentliches Merkmal virtueller Realität (VR)

1. Introduction

The term immersion has long been used, metaphorically and informally, to describe deep absorption in a text or in a task. However, it has found a new theoretical dimension through its association with virtual reality (VR), a use of digital technology that was conceived by its developers, from its very beginning in the 80s and 90s, as an “immersive/interactive experience generated by a computer” (Pimentel and Texeira 1993, 11). Under the influence of VR, the concept of immersion is now being applied to other media, both digital, such as video games, and traditional, such as film, TV, theatre, visual arts and literature. Immersivity can also be regarded as a desirable property of either individual works, that is, as a matter of form and content, or of whole media, that is, as a matter of resources. The metaphorical basis of immersion means total absorption in a liquid element that differs from the user’s normal environment; immersion therefore involves the replacement of the world, or reality, inhabited by the user with an alternate reality. Though this alternate reality is created by the signs of a medium, immersion is achieved when users experience it as unmediated, as they experience the real world. The disappearance of the medium from active consciousness is therefore a widely recognized condition of immersion. Another concept that has been invoked, especially by VR theorists, in connection with immersion is that of *presence* (Lombard and Ditton 2006). Immersion occurs when something that is not part of the user’s physical environment is felt to be “here”, or, alternatively, when users feel transported “there”, a place other than their actual location. As Gordon Calleja (2011) observes, however, the relation of presence to immersion is far from unproblematic: is presence synonymous with immersion, or is it one of the many forms or factors of immersion? VR researchers (Slater 2003) tend to see immersion (or rather, immersivity) as the objective properties of a system or medium, and presence as the subjective effect of these properties on the user.

The discussion below is divided into two parts: first, immersion in “new” (i.e. digital) media (sections 2 and 3), for which the term is predominantly used; then immersion in “old media” (sections 4 and 5), whose experience is being retroactively reconceptualized in the light of new media discourse. Visual arts and narrative fiction are selected to represent “weak”, non-digital forms of immersion, but other media such as film and theatre could also be discussed in terms of this kind of experience.

2. Immersion and Virtual Reality Technology

The idea of immersion is axiomatic to the definition of VR. The oxymoron of virtual (=non-real) reality refers to a computer simulation of non-existing or distant objects or environments that makes the user experience them as if they were real and present. When trying

to capture the exact nature of immersion, VR researchers often rely on literary comparisons, such as “being in an engrossing book”, or “suspending disbelief”, as the poet Coleridge characterized the attitude inspired by literary fiction (Pimentel and Texeira 1993, 15). This idea of suspending disbelief suggests that immersion is the result of a deliberate attitude rather than an illusion. VR researchers Mel Slater and Maria Sanchez-Vives argue that the disappearance of the medium is never complete: users only experience presence when they remain aware in the back of their heads that the object of their perception is a computer-generated image. In real life, we take the presence of the environment that surrounds us for granted and we do not reflect on it; in VR, by contrast, the experience of presence should become a cause of wonder and a potential source of pleasure. As Janet Murray writes: “It is in fact this double consciousness that makes VR so thrilling—our sense that the virtual world seems so real despite our knowledge that our feet are still planted in this world” (2020, 19).

The immersivity of VR relies on technological features that increase the life-likeness of the display and establish a cognitive or experiential relationship between the user and the virtual world. Here is a tentative list of these features.

Separation of the virtual world from the actual world: Devices such as head-mounted displays and data gloves hide the real environment from perception and lock users inside the simulation.

Interactivity: The ability to manipulate the objects presented by the system or to move further from or closer to them increases the sense of their presence, since the user is not separated from them by an invisible glass pane as in film or television. In VR systems, interactivity reinforces immersivity rather than constituting a separate property.

Embodied participation: Users receive a virtual body, and operate it through the movements of their real body. The computer keeps track of the position of the user’s virtual body and updates the display accordingly.

Natural interface: Insofar as VR simulates the way we relate to the real world, users should be able to interact with the represented world through their voice or the gestures of their own body rather than by using a keyboard, joystick or mouse. This means that participation in virtual realities should not require a long learning period.

Identification with virtual bodies. VR may present the user’s virtual body from either a first-person or a third-person perspective. In this latter case, immersion depends on the system’s ability to convince users that the body-image they see is their own body.

Three-dimensionality: There is no need to dwell on the superiority of a 3D representation of objects, in terms of life-likeness and ability to convey a sense of their presence, over the use of linear perspective.

Panoramic display: Whereas in media such as film, TV, and computer games the display is framed by a visible device, in VR it extends all around the user, and it seems unlimited. But this infinity is an illusion, since the computer can only handle a finite amount of data.

Rich sensory display: The more senses are involved, the more immersive the display. Sight and sound, our main ways to experience the world, are easy to simulate, and a sense of touch can be provided by data gloves that produces vibrations and suggest the resistance of solid objects, but smell and taste remain elusive. Smell can be suggested through scratch and sniff cards, but the awareness of the card is anti-immersive. The immersivity of sensory data depends on high resolution for sight and stereo effects for sound.

Extending reality: VR is not just a “reality simulator”, but also an “unreality simulator” (Slater and Sanchez -Vives 2016, 6). It can provide experiences that are not possible in normal

life, such as flying like a bird, dancing with dolphins, or climbing mountains without risk of falling. A particularly immersive feature of VR is the ability to place users in the bodies they wished they had, or, alternatively, to place them in disabled or racially different bodies to make them experience what it is like to live in such bodies.

One may wonder how VR can create believable simulations of real or of imaginary worlds, given the necessary limitations of its data. Slater and Sanchez-Vives (2016, 5) suggest that its immersivity is due to the nature of perception, which does not simply reproduce the world in a mechanical, bottom-up process, but also uses top-down schemata such as past experience, expectations and beliefs to complement and interpret sensory data. In other words, even though the data presented by the computer may be rough and schematic, it achieves pseudo reality through the brain willingness to fill it in with information. The efficiency of VR in treating certain psychological conditions—one of its many applications-- lies in the fact that the brain reacts to simulated data in the same way it reacts to the real thing.

In the early days of VR, several authors, including Heim 1993 and Murray 1997, have proposed the fictional Holodeck of the TV series *Star Trek* as a model for the experience that defines the medium: immersive, interactive and computer-generated. The Holodeck consists of an empty cube on which a computer projects a three-dimensional world simulation. The user steps into this world and interacts with synthetic characters operated by artificial intelligence. No matter what the user says or does, the system responds coherently and integrates the user's input into a narrative arc that sustains interest. The user becomes both a character who experiences the narrative from a first-person perspective and a spectator who appreciates it for its intrinsic appeal. The narrative dimension of the Holodeck remains an unrealized, and probably unrealizable dream, because it requires of the computer a feat far beyond the reach of artificial intelligence: not only should the computer be able to create a good story—a goal that no system has managed to achieve so far—it should also be able to integrate the user's unpredictable actions into the narrative arc. The Holodeck comparison had a detrimental effect on the development of the medium. Around the year 2000, when it became clear that VR would not deliver the Holodeck, the public lost interest, and the technology went into hibernation as a form of entertainment. It wasn't until the late 2010s, when reasonably priced equipment was developed, that VR-based applications, especially video games, became available for the general public.

Despite the wealth of its immersive features, VR presents several obstacles to immersion. The response of the system to the position of the user's body may lag, causing a widely documented sensation of motion sickness. While VR installations create their own world, they do not cancel the existence of the real world, and users may accidentally bump into the walls or stumble upon the furniture of the room where the system is installed. The responsiveness of an object may not match the realism of its representation. Users will be frustrated if they cannot interact with a perfectly life-like dinosaur, because no behavior had been programmed into the creature. The encumbering equipment required by the medium may discourage people from using it, or limit their use to short visits. Time limitations are also made necessary by the vast amount of data required of the system, as well as by the intensity of the user's experience: it is hard to imagine people spending hours in a VR system. For all these reasons, VR is unlikely to rival media such as books, film and screen-based video games as a form of entertainment.

3. Immersion and Computer Games

In contrast to VR, which has yet to produce widely popular applications, and remains so far largely confined to science, training, therapy, long-distance operations, and occasionally installation art (Bailenson 2018), video games are a dominant medium of entertainment. Like VR, they combine interactivity with visual and audio data, and they may offer some haptic feedback, but because they are limited to the visible frame of a screen, and because most of them lack three-dimensionality, they cannot rival the presence of VR-generated objects. This distinction between computer games and VR is however currently vanishing, as more and more games are developed for VR systems requiring goggles or helmets.

The present discussion of VR has so far treated immersion as a “single monolithic form of experience” (Calleja 2011, 34) toward which various resources converge, but computer games suggest the need for a more diversified conception. Laura Ermi and Frans Mäyrä (2005) propose three types of immersion for video games: 1. Challenge, or gameplay-related immersion, the passion players bring to solving the problems proposed by the game. The authors further subdivide challenge into “challenge of speed”, or pace, and cognitive challenge. The first kind occurs when the user must react quickly to respond to the actions of other characters (either system-created or human), as in fight-centered games. Its ideal manifestation is the experience of flow, a concept originally proposed by Mihály Csikszentmihalyi: “In this highly intensive state, one is fully absorbed within the activity, and one often loses one’s sense of time and gains powerful gratification” (2005, 2). The second kind, cognitive challenges, occurs in games where the player must solve riddles to progress, without time limitations. It can be compared to the experience of solving cross-word or Sudoku puzzles. 2. Immersion due to presence effects, “the psychological experience of non-mediation” (2005, 4). This type of immersion depends on the quality and diversity of the sensory signs, such as realistic visuals, sound effects conveying a sense of space, and music that stimulates the player’s activity. 3. Imaginative immersion, created by the narrative scenario built into the games. This scenario provides players with practical goals to pursue, and it often invites them to create their own character, or avatar. The relative importance of these forms (or causes) of immersion depends on the particular type of game: challenge dominates abstract games and first-person shooters, sensory immersion is prevalent in games that appeal through the beauty of the gameworld, and imaginative immersion is strongest in games that conceive gameplay to moving through the gameworld in search of a story. Other researchers have further diversified the causes of computer game immersion; Gordon Calleja (2011) distinguishes kinesthetic involvement (the development of the motor skills necessary play the game, as well as the player’s identification with the avatar’s body), spatial involvement (the pleasure of exploring the gameworld), shared involvement (forming social relations with other players in multi-player games), affective involvement (feelings of excitement or frustration depending on one’s success; the desire to beat the game), ludic involvement (Ermi and Mäyrä’s challenge) and narrative involvement (Ermi and Mäyrä’s imaginative). Ryan (2015) proposes to further divide narrative immersion into three components: spatial (a sense of place and a model of space, necessary to take proper actions in the gameworld), temporal (a burning desire to find out what happened next, sustained by curiosity and suspense), and emotional (attachment to characters and to one’s avatar). Of these three components—whose applicability transcends particular media—spatial immersion is the most dominant in video games, because of their ability to create a beautiful environment in which the user can move and act, while emotional immersion is the most problematic. Video games are stronger in creating self-directed emotions for the player’s avatar than in inspiring other-directed emotions for system-created characters,

because these characters are usually seen as either enemies to be eliminated or as helpers whose sole purpose is to provide information that enables players to progress in the game.

In an ideal world the various forms of video game immersion would support each other, but conflict often occurs. For instance, the sense of the presence of the gameworld is stronger when its visual representation occupies the entire screen; but in order to facilitate player action, screens are often cluttered with tool bars, menus or small maps that break the unity of the display. Since the conversational ability of computers remains limited, games that require a dialogue between the player and NPCs (non-playing characters) usually rely on menus of canned responses that interrupt the live action. To flesh out their narrative, computer games often rely on non-interactive, cinematic “cut scenes” that temporarily reduce the player to the role of spectator. And finally, the necessity to provide opportunities for player action severely limits the variety of available narrative scripts: the vast majority of games rely on the pattern of the quest of the hero, where the user must perform various physical tasks in order to progress in a scenario that can be indefinitely extended to new levels of difficulty. Another common scenario is the nurture / manage plot, where the player must raise, grow, oversee or keep alive a baby, pet, farm, city, or an entire family. The best way to make narrative the center of interest is to limit user participation to discovering a story in which they play no role by exploring the game world, as is the case in the genre known as “walking simulator”. This difficulty of reconciling narrativity and interactivity explains why game narratives have not reached the diversity and complexity of film, theater and literary narratives. We should not expect *Hamlet* in either computer games or VR anytime soon. This does not mean, as Ian Bogost (2017) has suggested, that games are better without stories. Even if their narrative potential does not rival that of novels or film, computer games still have much to gain by trying to realize this potential.

4. Immersion and Visual Art

Though the term of immersion was popularized by digital technology, the visual arts have cultivated since the antiquity an ideal of life-likeness that captures the essence of the VR experience. According to a legend reported by Pliny the Elder, two Greek painters engaged in a contest for who was the best. One of them, Zeuxis, painted grapes so life-like that birds tried to pick at them. The other, Parrhasius, asked Zeuxis to look at one of his paintings that was behind a curtain; but when Zeuxis tried to remove the curtain he could not, because it was painted. Parrhasius was judged the winner, arguably because in ancient Greece, humans were considered harder to fool than birds. In both cases, the life-likeness of the picture suggests behaviors that go beyond visual perception: it creates the sense that the represented object can be touched, manipulated, and in the case of the birds, eaten. While immersion differs from illusion, in the sense that users remain aware of facing a representation, both involve the passing of the representation for the represented object. The art critic E. M. Gombrich coined the term of *aesthetic* illusion to mark the difference between being fooled by an image and merely pretending to face its referent.

In the Middle Ages, realism in art gave way to symbolism: representations were interpreted as signs of the represented reality, rather than as this reality itself. Medieval paintings of religious figures did not try to convey a sense of their presence, but rather, expressed their spiritual significance through the use of conventional attributes. The representation of space made no attempt to imitate visual perception, and its flatness kept it separate from the space occupied by the spectator. All this changed in Renaissance Italy with the discovery of the laws of

linear perspective, a code which the artists of ancient Greece and Rome had been unable to crack. Now a three-dimensional space could be projected on a two-dimensional surface, and pictorial space could be experienced as a continuation of real space. This meant that spectators felt corporeally present in the depicted world, even though they could not step in it literally. Perspective painting did not allow people to walk around objects and examine them under different points of view, but it gave the impression that they could, and that there was more to objects than what was shown in the picture. The sense of inclusion of the spectator in the pictorial space reached its high point in the amazing trompe-l'oeil effects of the Baroque. Using the technique of *quadratura*, through which the painting extended the architecture of the building, and the perspective *di sotto in su* (from below to above), the frescoes of church ceilings opened the earthly building toward heaven and drew the spectator toward God, often represented as light radiating from the apex of the ceiling

The search for immersive illusion took a more technological turn in the 19th century with the invention of stereoscopes, which fused a left eye and right eye image for a three-dimensional effect, and a more practical turn, in the same century, with the creation of 360-degree panoramic pictures that extended all around the spectator. The necessity to turn one's head and body to apprehend the spectacle in its entirety can be viewed as a primitive form of interactivity. While the development of abstract art in the twentieth century represents a rejection of illusionism, immersion regained its hold on the visual arts with Surrealism and its life-like depictions of impossible objects. Nowadays, the use of computer technology in installation art makes representation multisensory, interactive, panoramic and three-dimensional, and it allows virtual worlds both realistic and fantastic to approximate ever closer the presence of the material world (Grau 2003). By placing spectators inside the space of the action and by enabling them to interact with the actors, the contemporary movement of immersive theatre breaks the traditional fourth wall of the medium through non-technological means, but whether this practice is really immersive, or leads to a greater awareness of participating in a mediated representation, is open for debate.

5. Narrative Immersion

Literary narrative lacks the sensory stimuli of the media discussed so far: the interpretation of linguistic signs into concrete content is entirely dependent on the reader's imagination. And yet its immersive power is widely celebrated by metaphors such as "being lost in a book" (Nell) or "being transported into an imaginary world" (Gerrig), as well as by the poet Coleridge's formula of "suspension of disbelief". Immersion was first invoked in connection with narrative texts, more specifically literary fiction, by French theorist Jean-Marie-Schaeffer (1999). Before the term became fashionable, the experience of readers engrossed in a text was described by the notion of aesthetic illusion, borrowed from the visual arts (Wolf 2014).

As the transportation metaphor suggests, immersion presupposes a location to which readers travel in imagination. Immersion occurs when readers relocate themselves mentally into the world constructed by the text, and regard this world as real in make-believe, which means, as existing independently of the medium. This idea of make-believe (Walton 1990) suggests that immersion is specific to fictional texts, but readers can also be immersed in the worlds of factual narratives, when these worlds are represented with sufficient vividness to overcome the distance inherent to verbal representation, a distance due to the fact that one does not normally tell stories about what happens here and now. Factual texts have an immersive advantage over fictional ones

because they provide information and knowledge about the real world, and readers have a vested interest in the affairs of the world they live in. But fictional texts have an immersive advantage over factual ones because they are not limited to reporting the knowable and documentable, and they can use a wider variety of narrative techniques that confer more presence to the textual world. If we combine the immersivity of factual and fictional texts, we get the genre of creative non-fiction, or true fiction (such as true crime), which has emerged in the early 21st century as one of the most popular forms of creative writing.

Lacking interactivity and sensory dimensions (at least when graphic effects are not used), written texts can only inspire the third of the three types of immersion described by Ermi and Mäyrä: narrative immersion. It is indeed hard to conceive immersion through a text that does not construct a world, or through a textual world where nothing happens. Literary narrative may lag behind its visual relatives when it comes to spatial immersion, but it is unsurpassed in its ability to produce the other two types of narrative immersion: inducing emotional responses to characters, and capturing the reader in the temporal flow of the plot.

As a pre-attentional state that evades self-reflexivity (one cannot experience immersion and being aware of being immersed at the same time), textual immersion is difficult to describe in cognitive terms. An important condition of immersivity is effortless access to the textual world. This means that readers must be able to rely extensively on their life experience, or on their familiarity with the world of other texts of the same type. Another factor of immersion is the ability to form mental imagery; once again, this ability depends chiefly on life experience, but it can also derive from the reader's familiarity with certain generic landscapes, such as that of fairy tales. To follow the evolution of the storyworld, readers must be able to construct so-called "situation models" (Zwaan 2005) of the states of affairs represented in the text, and to produce a dynamic simulation of the narrated events by regularly updating these models. Insofar as situation models are independent of the exact wording of the text, they support the idea that immersion requires the disappearance of the medium. The experience of immersion also involves the phenomenon of motor resonance, through which the textual representation of the gestures of characters activates in the reader's brain the same neural processes as the physical performance of these gestures in the real world.

In the mid-nineties, efforts were made to impart interactivity to textual narrative by dividing texts into fragments and by connecting them through a non-linear system of links, known as hypertext, that afforded the reader a choice of itineraries through a textual network (Bolter 1991, Landow 1997). Though hypertext narrative attracted great attention from literary theorists, and was hailed by some of them as the narrative form of the future, it never caught on with the general public, because the freedom it gave to the reader conflicted with temporal immersion. Insofar as readers can reach the same node through different paths, the author loses control over the dynamic disclosure of narrative information. The non-linearity of the system of links therefore prevents the fundamental narrative effects of curiosity, suspense and surprise (Sternberg 1992), which rely heavily on what the reader knows and does not know at any given point in the reading process.

6. Conclusion

What in the end is immersion? As a metaphorical term, it has no precise definition, and it cannot be associated with a specific neurological state, because, as Schaeffer writes, immersion is a black box, "cognitively impenetrable" (2005, 238). Some people associate it with any kind of

deep attention, so that one can be immersed in music (either playing or listening), abstract art, chess, crossword puzzles, computer programming and non-representational games like Tetris no less than in the narrative worlds of literature, film, drama and online games. Others—this would be the inclination of the author—regard immersion as inseparable from mimeticism. A work must create a world filled with objects, events and characters to motivate users to transport themselves in imagination into its world. According to this view, you can be immersed in video games, VR, language-based narrative, film, drama and some paintings, but not in abstract art, crossword puzzles and computer programming. And finally, since all the metaphors that describe immersion are spatial (cf. transportation, presence, being lost in a book), immersion could be conceived as making oneself at home in a represented world, rather than as imagining this world under all its aspects. Then the immersivity of a representation will be a spatial experience, as opposed to a response to its emotional and temporal dimensions. This interpretation may work for certain practical applications of VR, but for entertaining media it takes the spatiality of the metaphor too literally. In games, literature, or film, immersion is a global state of mind to which meanings and effects of many different kinds may contribute.

Whichever conception one endorses, it is important to avoid confusing immersivity with aesthetic value. For most people, immersivity is a desirable feature of media or of individual works, but the idea of the disappearance of the medium clashes with the postmodern aesthetics of self-reflexivity and visibility of language. There are artistic works that deliberately challenge immersion, and there are immersive works, especially in popular culture, that are not regarded as art by literary critics because they rely on predictable formulae rather than on defamiliarization. But their ability to lure users into their world is precisely what makes these works popular.

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