# TECHNOLOGICAL AND LITERARY IMPLICATIONS OF VIRTUAL REALITY

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*Abstract*

*The study's main goal is to pinpoint and describe some of the most important characteristics and functions of virtual reality (VR), as seen from a techno-cultural perspective. Consequently, VR is perceived both as a technological product and as a cultural construct. In the first case, the analysis focusses on the technical apparatuses of VR; in the second case, the theoretical mainframe examines several postmodern fiction works that are considered relevant to the aesthetic evolution of the field.*

***Key Words: virtual reality, techno-culture, postmodern fiction***

The study's main goal is to pinpoint and describe some of the most important characteristics and functions of virtual reality (VR), as seen from a techno-cultural perspective. By means of methodological instruments extracted from both the history of literature and the theory of culture, it attempts to define and illustrate the use of virtual reality in postmodern fiction. Consequently, a two-folded operational quality of virtual reality will be underlined: VR as a *technological product* and as a *cultural construct.* In the first case, the analysis focusses on the technical apparatuses of VR; in the second case, the theoretical mainframe examines several fiction works that are considered relevant to the aesthetic evolution of the field.

In the last fifty years, postmodern fiction can be significantly defined through its interaction process with virtual reality. As a result, the iconic

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topography of the postmodern narratives does no longer reflect a surface, but an *interface*.[1] From this perspective, as far as technical options (format, illustration, sometimes even textual material) and narratological options (space-time displays of virtual reality) are concerned, some of the fiction works written in the last decades, which mainly belong to the cyberpunk genre, may be regarded as a fluid screen between two disseminating types of reality. At the same time, when the surface itself is frequently defined as an interface (a conventional border between two environments/systems which become active through a permanent, mutual exchange of data), in terms of its instantaneous and "atopic" quality (Virilio, 1993:18-19), accepting VR as both the cause and the effect of a global optic field becomes the basis of any techno-cultural investigation.

Virtual reality may be treated less as a pure form of reality (be it computer-generated, simulative, interactive, immersive), and more as an open, hybrid product of inter-related techno-cultural fluxes of power. Such exchanges of fluxes may arise at the interface between: *VR and cyber reality* (giving birth to a *global postreality,* that is a new form of reality, optically digitalized and globally expanded); *VR and mental reality* (giving credit to the hypothesis of cognitive psychologists and artificial intelligence researchers, that the human mind works like a computer and its neural operations present characteristics similar to those of virtual simulation operations); *VR and hyper-reality* (through the transformation of simulation into simulacra and of the immersion inside the image into an ontological performance).

In hyper-real terms, virtual reality has gradually transformed itself into a *modus vivendi*, an autonomous substitute for reality, capable of generating its own forms, aesthetical categories and axiological systems of representation. Moreover, due to its globalizing tendency, VR may be considered the visual core of our present social, economic, political, cultural, and even religious and mythological experience.[3]

The boundaries of the field have expanded with such unpredictable speed, that the potentially damaging consequences of its development became subject for debate for both the opponents of hyper-reality, such as Baudrillard or Chomsky, and its most devoted supporters, such as Eco. For instance, Jean Baudrillard, the anti-prophet of hyper-reality and, paradoxically, its most

[2] On the footsteps of communication theorists Paul Virilio and Mark Dery, Sorin Alexandrescu notices that the process of interfacing is characteristic of the *speed-space* of postmodern virtual reality (1999:11). It may transform itself into the *post-human spatial void* described by the cyberpunk fiction writers: a zone of bio-technological acceleration, leading to utter disintegration. Such a phenomenon, ruptured by violent processes of spatial compression, may generate a space-time and social barrier between persons and communities living in *the local realtime* and those trapped in the flow of *the virtual global time* (see Virilio, 1984; 1990; 1995, and, especially, 1998).

[3] See Grau's theory of virtual reality as *visual history*: "[...] a zone of ritual activity, a private artificial paradise or a public sphere with political influence" (1999:365).

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reputed theorist, describes the involution of images from reality to hyper-reality, in terms of desemantization and desubstantialization. In Baudrillard's view, the involution of the image follows several theoretical steps: the image as a reflex of a profound reality; the image as a mask and a distortion of reality; the image as a mask of the absence of reality; and, finally, the image deprived of any kind of reality – the image as "its own, pure simulacrum" (1985:17). The process of iconic desemantization therefore coincides with a disturbing meta-absence.[4]

A more balanced perspective on the techno-cultural role of VR is to be noticed in *Technorealism*, a manifesto of the twelve technological theorists (Bennahum et. all.), distributed on the Internet starting March 12, 1998. Promoters of a moderate techno-cultural criticism which differs both from the theoretical position of the adversaries of VR (Chomsky, Kroker, partially Baudrillard), and from the one of its enthusiast visionaries (Negroponte, Gates, partially Lévy), the twelve authors present moderate comments on the communicational instruments which may shape the future. At the same time, they attempt to provide an impartial analysis of VR's social and political implications.[5]

In between *anti-utopian (cyber-totalitarian)* and *utopian (cyber-libertarian)* extremes, the authors of the manifesto choose several moderate principles of "technorealism": *the non-neutrality of technologies* (through their structure and interactive patterns, the digital tools encourage new perspectives of the world); *the anti-utopian character of the Internet* (the more cyber-space gets populated, the more it resembles real society); *the maintaining of governments at the electronic* "*frontier"* (cyber-space is not an autonomous geo-political or jurisdictional space, severed from the real life); *the establishing of precise differences between information and knowledge* (the speed of data proliferation requires updated methodological measures); *the establishing of precise differences between educational informatization and education* (the art of teaching and learning can not be performed or duplicated by computers); *the need for informational privacy* (through copyright or security norms which are best fit for the new digital environment); *the democratization of the network* (through the enhancement of the public use and property in and of the new "technological arena") and *the achievement of global citizenship* (through the powerful social impact of the interface processes and through the democratic use of digital tools).[6]

Each of these principles may be questioned in terms of radical techno-cultural skepticism. If technologies that enable the circulation of information

[4] See mainly the theory of "manipulative consumerism" from *La Societé de consommation* (1970).

[5] See Bennahum et. all., on the criticism of interfaces as presumably reliable tools of human everyday life (1998, *on-line).*

[6] Bennahum et. all.

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are no longer considered neutral, will the use of information become an exclusive manipulative tool? Does the virtual world copy the features and functions of the real world, or is it the other way round? How useful is the administrative role of real governments in a digital space which can instantaneously achieve self-administration? What measures of protection will the real educational system adopt, when the computerized tool will eventually/potentially replace the human factor? How can copyright rules be efficiently applied to the Internet's "no man's land"? What may the anti-utopian implications of the global citizenship ideal be, in a 21th century geo-political world where the economic and cultural distances seem to be as huge as two centuries ago? This study will not focus on the ethical debate of VR technologies, but on their aesthetical implications.

However, in both perspectives, virtual reality can be defined as a simulative, computer-generated reality, which relies on the interactive immersion of the user in a digitalized environment, by means of specific technological equipment.[7] Its historical evolution may be traced back by using Robert J. Carande's essential guide, *Information Sources for Virtual Reality* (1993). On the footsteps of R. M. Hayes and his book, *A History and Filmography of Stereoscopic Cinema* (1989), Carande identifies Sir Charles Wheatstone as a VR pioneer: in 1830, Wheatstone invents a mechanical device which enables the viewer to perceive two copies of the same image from two different angles, generating a potential "3-D effect" (Carande, 1993:x). Wheatstone's discovery is followed by the invention of the prismatic lenses and of the stereoscope – both, artificial means of duplicating the image. Around 1850, Coleman Sellars builds the kinematoscope, one of the first optical devices which reproduces 3-D motion. More than a century after Sellars' discovery, the rudimentary techniques of 3-D *reproduction* become sophisticated techniques of 3-D *production*. In 1963, a year associated with the birth date of VR, Mort Heilig creates *Sensorama*, a system through which images and sounds are enhanced via a sensorial and tactile *feed-back*. By placing his or her head inside Heilig's device, the user could actually *live a 3-D experience*, such as driving a motorcycle. Two years later, Ivan Sutherland becomes the first scientist to engineer a wearable stereoscopic device, called *Head-Mounted-Display* or *HMD*. With the *HMD*, the user could actively take part in exotic rearrangements of the surrounding virtual space. For the first time in the history of VR, the user is no longer regarded as passive, but can actually

[7] According to this definition, virtual reality can not exist in the absence of specific technological devices: helmets, googles, digital gloves. A less restrictive definition relates VR to any cybernetic space and its use to the accessing of any digital resources. As a result of such a permisive taxonomy, any Internet user may become a VR user, which is largely incorrect. However, this study will reshape both definitions, regarding them as complemmentary.

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move from one place to the other inside the computer-generated environment. Helped by the *HMD* and the *Dataglove* (another device designed by Sutherland for better orientation inside the virtual space), the user is immersed in an interactive, dynamic image. Still in the 70's, Myron Krueger coins the notion of *artificial reality (AR)*, technically corresponding to a complex imagistic projection: the human body not only travels through the VR environment, but also controls it by means of movements and gestures, in a synthetic experience.[8]

On the other hand, *virtual reality* and *artificial reality* do not represent the same kind of reality. A clear distinction would be that VR implies the use of a complete immersive technology, mainly mediated by goggles, while AR implies the use of a non-immersive technology, such as kinesthetic systems. However, the difference between the two kinds of realities/devices is not always precise. For instance, starting from the eighties, NASA materialized the concept of *telepresence* in order to electronically control the flights in outer space: a kinestetic, visual and tactile system, structured on mechanisms of feed-back which transform the computer engineer both into a non-immersive agent of control and an immersed actor within the environment subject to his or her research. The *Pathfinder* mission, which led to the exploration of planet Mars' surface via a semi-autonomous computerized robot, relied on a virtual mapping process generated by the immersed robot. Techno-cultural theorists assess that, in the future to come, the exploration of the outer space will use more and more the perspective of telepresent robots. In such cases, computer operators from Earth might "see" and "feel" reality through the "sight" and "touch" of different robotic devices, and then recreate the same reality as a virtual 3-D laboratory map.

As far as postmodern fiction is concerned, *telepresence* has already become an operational concept, functional in defining the relation between characters and the virtual reality of future environments. In the cyberpunk novel *Virtual Light* (1993), William Gibson's heroes from the digitalized society of 2005 use telepresence as easily as we use the e-mail (1995 b:21), while in *Holy Fire* (1996), Bruce Sterling's novel situated within the timeframe of 2095, when asked if she had ever visited Indianapolis, protagonist Mia Ziemann, provides a techno-cultural answer: "Telepresence." (1997:109). Theorized by virtual analysts such as Cotton and Oliver (1994:193), the term *telepresence* was apparently coined by Marvin Minsky in 1979. At first, it referred to a remote control electronic technology to be used in real emergency cases (fires, chemical or nuclear accidents etc.). Minsky's notion was inspired by a science fiction novel: Robert A. Heinlein's *Waldo* (1940), where the author uses the terms *telerobotic control*. Nowadays, telepresence is viewed more like a psychological experience, generated either by the user's immersion in a VR

[8] See Carande, work cited:xii

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environment, or by his or her feeling of "being at the same time in two different places" by means of remote robotic control.

Together with the concepts of VR and AR, one may also take into account the notion of *enhanced reality* (ER). Developed by Alexander Chislenko in 1997, *enhanced reality* provides the user with an image of the surrounding world which is a direct result of enhancing human perception via customized interactive, multimedia systems. Imagined as intelligent filters of reality, these means of "augmenting" perception consist of: *volume control devices* (which artificially adjust sensorial perception, such as sight or hearing); *calibration instruments* (which extend the senses to ultrasound perception, for instance); *reality filters* (which process the signals of the surrounding environment and eliminate sensorial "parasites"); "*improvements of the world"* (which provide different colours or shapes for the surrounding environment); *artificial adds* (which project virtual objects or beings on the visual image of the exterior world). In order to illustrate his "intelligent filters" ant their ER effects, Chislenko turns to the video-digital morphing technique, which enables the user to modify at will the face, the body or the clothing of a designed person.

Among the fields of activity which are influenced by VR technology and its correlatives (AR or ER), one may consider very different areas, such as medical treatment, industrial design or psychiatric therapy. In the United States, industrial designers use a particular kind of VR, called *"augmented reality"* and developed by *Siemens Corporate Research, Inc.* from Princeton, New Jersey. The application enables the user to visualize and virtually modify parts of the pipelines he or she intends to implement or change inside a specific building.[9] Still in the U.S., doctors sometimes perform *virtual surgery*, while in Japan, before purchasing the real product, the client is encouraged to design a *virtual bath or kitchen*, according to his or her own aesthetic or functional ideals. A similar computer program, stimulating and using the client's interest in virtually designing the interior of his or her house, is available for customers on the *Ikea* company site. At the same time, in Great Britain, the potential buyer is able to visit his or her *virtual house*, before actually closing the deal. Some tour operators provide sightseeing opportunities in virtual holyday places, which the clients are able to visit in the manner of Arnold Schwarzenegger in the S.F. movie *Total Recall*. Last, but not least, German neurologists who undergo investigations on the human brain's activity during sleep time use VR in order to "map" the dreams of their subjects, and therefore create a "virtual onirical space". In this particular instance, the immaterial nature of the unconscious gains "consistency" due to the process of virtualization, which

[9] See Roger, 1999:32B

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reverses the relation between original and copy: the virtual copy becomes the material original of an evanescent prime reality.

The causal and chronological reversed relation between original and copy is frequently illustrated in postmodern fiction by the mainstream novels of Canadian author Douglas Coupland. In Coupland's view, the electronic copies of the exterior reality are always to be understood as referential originals. For example, in the novel *Shampoo Planet* (1992), the color of the sky is described less as the result of chemical and physical processes which the human eye perceive as natural exterior reality, and more as the component a virtual reality preexisting the natural reality: "The sky is a nutritious deep electronic blue today." (Coupland, 1993:14)

A similar description of the exterior reality by means of referring to the virtual reality which supposedly comes before it is available in William Gibson's classic cyberpunk novel, *Neuromancer* (1984). The first sentence of Gibson's masterpiece is: "The sky above the port was the color of television, tuned to a dead channel." (Gibson, 1995 a:9). In a similar manner, in Coupland's novel, *Life after God*, the sun is described as "a microwave filament" (Coupland, 1994:105), while in *Girlfriend in a Coma*, the sky is perceived "clean and blue […] like a freshly squeegeed window" (Coupland, 1998:3). In Coupland perspective, the iconic mediator (the glass of the postmodern buildings, which is being associated with an interface between the real, material world and the virtual, computerized environment) becomes the privileged exterior referent.

The reversal of order between original and copy, as well as the qualifying of the virtual world as the primordial referent has serious semiotic consequences in postmodern narratives. In Umberto Eco's view, the linguistic sign comes before the exterior reality (the theory of the meta-signs within the medieval library from *Il nome della rosa*, 1984:396), while, in Thomas Pynchon's perspective, a considerably large window of paraphrenic interpretative opportunities opens at the crossroads of the signified and significant. Such an opening argues that the Saussurian arbitrary characteristic of the linguistic sign actually rules the entire real world (the theory of the semantic death of the universe, generated by a decisive split between the icon and its consensual meaning, from *The Crying of Lot 49*, 1979:75). Both writers conceive their narratives as *interfaced dimensions* in between what is semantically *valid* (the real world inside the epic frame) and what becomes semantically *possible* (the virtual world of the story's variants).

Let us get back now to the daily technological use of the "primordial electronic imitation". The technical feature specific to each and every technological embodiments previously described represents the very essence of virtual reality. VR enables the user to explore a computer-generated universe by

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means of his or her own immersion in the simulated environment. Instead of looking at a flat, bi-dimensional screen, the user is immersed in a 3-D world of virtual graphics, which he or she is able to influence in a way similar to that in which he acts in the real world.

Nowadays, researchers frequently speak of *virtual screens, virtual images,* or *virtual memory.* The *virtual screen* represents an area larger than the monitor's dimensions, which can contain images, texts, windows etc. The monitor's function is to merely "act as a window of the virtual screen" (Collin, 1995:277), providing the user with the opportunity of visualizing a specific part of the virtual screen. The *virtual image* consists of a complete image which is being stored in the computer's memory, while the *virtual memory* refers to a set of operations and parameters through which the hard disk of a computer is able to simulate the behavior of a *RAM (Random Access Memory).*

According to some virtual reality theorists, virtual reality is understood as a simulation, rather than a duplication of reality (Cotton & Oliver, 1994:209). A fictional example of the simulative feature of reality when melted in VR emerges from William Gibson's novel, *Idoru* (1996). Gibson's characters in the future travel via telepresence to a meeting in Tokyo; they also go for a walk in a 3-D computer-synthesized jungle with virtual sensorial adds (1997:11).

As a conclusion, in all types and instances of virtual reality, there are at least three essential technological coordinates, which represent VR's main characteristics. Firstly, the "*creator"* of VR is the *computer* – as a productive tool, it designs the virtual environment, it generates its components and it administrates them. However, the term creator must be placed between quotations, due to the fact that there still exists a relation of cognitive conditioning/subordination between the original creator (the human being) and the secondary one (the machine). Secondly, VR's *environment* which the computer generates must provide an *isomorphic representation* of the user, which implements inside the digital world his or her own physical presence from the real world (an exception to this particularity is the so-called *through-the-window* VR instances, such as the old *Arcade* video games). Finally, the third and last technological characteristic of VR refers to the *user* and reflects the *interactivity* process, by means of which the user is enabled to actively perform within the VR environment. In such circumstances, the user becomes a direct participant/manipulator of the simulative reality. Interactivity testifies to the degree of technological freedom provided by the electronic environment, and, at the same time, to the user's own aesthetic pleasure, which allows him or her to be seduced by a dynamic, flexible offer of participation.[10]

[10] VR theorist Jaron Lanier illustrates the appealing *stylistics of interactivity* by referring to the main feature of *Apple* computers as "a new form of art" (1996:169).

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Both the technological coordinates of VR and its fictional variants strengthen the authority of a doubly determined field. On the one hand, VR is directly dependent of the evolution of digital equipment and electronic devices, which turn it into a *technological reality*. On the other hand, VR is constantly reshaped by the fictional projections of postmodern narratives, which turn it into a *cultural construct*. At present, the interactions between the two zones of techno-cultural influence can no longer be excluded from any theoretical debate on virtual reality. From such a mixed perspective, the doubly determined quality of VR (technological and literary) becomes indispensable for the study of the field. Evenly balanced, such an interdisciplinary perspective may prove indispensable to enlarging the theoretical potential of virtual reality studies.

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