# Immersion vs. Interactivity: Virtual Reality and Literary Theory

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1. Few of us have actually donned an HMD (head-mounted display) and DGs (data-gloves), and entered a computer-generated, three-dimensional landscape in which all of our wishes can be fulfilled: wishes such as experiencing an expansion of our physical and sensory powers; getting out of the body and seeing ourselves from the outside; adopting a new identity; apprehending immaterial objects with most of our senses, including touch; being able to modify the environment through either verbal commands or physical gestures; seeing creative thoughts instantly realized without going through the process of having them physically materialized. Yet despite the fact that virtual reality as described above is still largely science-fiction, still largely what it is called --a virtual reality--there is hardly anybody who does not have a passionate opinion about the technology: some day VR will replace reality; VR will never replace reality; VR challenges the concept of reality; VR will enable us to rediscover and explore reality; VR is a safe substitute to drugs and sex; VR is pleasure without risk and therefore immoral; VR will enhance the mind, leading mankind to new powers; VR is addictive and will enslave us; VR is a radically new experience; VR is as old as Paleolithic art.
2. This flowering of opinions is fanned by the rhetoric of the gurus of the technology:

   > Worldwide, VR is happening in protected
   > pockets of technology; inside giants
   > corporations, universities, and small
   > entrepreneurial start-ups; in Berlin and North
   > Carolina; covering Japan and especially in the
   > San Francisco Bay Area. . . . A rare excitement is
   > in the air, an excitement that comes from
   > breaking through to something new. Computers
   > are about to take the next big step--out of
   > the lab and into the street--and the street
   > can't wait. (Pimentel and Texeira, 7)

   This sense of anticipation permeates all books about virtual reality. They are less concerned with what has been achieved so far than with what will be available in the (we hope or fear) very near future. We may have to wait until the year 2000 to see VR become an important part of our lives, but since it is depicted so realistically by its prophets, and since it exists very much in the popular imagination, we don't have to wait that long to submit the claims of its developers to a critical investigation. In this paper I propose to analyze VR as a semiotic phenomenon, to place it within the context of contemporary culture and to explore its theoretical implications.

3. My point of departure is this definition by Pimentel and Texeira:

> In general, the term virtual reality refers to an immersive, interactive experience generated by a computer. (11)

While "computer generated" accounts for the virtual character of the data, "immersive" and "interactive" explain what makes the computer-assisted experience an experience of reality. To apprehend a world as real is to feel surrounded by it, to be able to interact physically with it, and to have the power to modify this environment. The conjunction of immersion and interactivity leads to an effect known as **telepresence**:

> Telepresence is the extent to which one feels present in the mediated environment, rather than in the immediate physical environment. . . . This [mediated environment] can be either a temporally or spatially distant **real** environment . . . or an animated but nonexistent **virtual world** synthesized by a computer. (Steuer 76)

4. Far from being restricted to VR, the features of immersion and interactivity can be regarded as the cornerstones of a general theory of representation and communication. The purpose of this paper is to explore the problematics of their textual implementation and to assess their significance for contemporary literary theory.

## Immersion

5. Since immersion depends on the vividness of the display, its factors are closely related to the devices that lead to realism in representation. A factor that comes immediately to mind is the projection of a three-dimensional picture. The introduction of perspective in painting took a first step toward immersion by creating a sense of depth that integrated the spectator into the pictorial space. But because the medium of painting simulates depth on a flat surface the spectator cannot break through the can vas and walk into the pictorial space. In the visual displays of VR the barrier disappears--there is no material plane of projection--and the user feels surrounded by a virtual world which can be freely "navigated" (as a standard metaphor of networking describes movement in cyberspace).
6. The creation of a 3D effect falls under a more general category that Steuer (81) calls "depth of information." This depth is a function of the resolution of the display, i.e. of the amount of data encoded in the transmission channel. As the other main source of immersion Steuer mentions the "breadth of information," a category defined as "the number of sensory dimensions simultaneously presented." Breadth of information is achieved through the collaboration of multiple media: image, sound, olfactory sign als, as well as though the use of technical devices allowing tactile sensations. VR is not so much a medium in itself, as a technology for the synthesis of all media.
7. Sheridan (58) proposes another factor of telepresence which stands halfway between immersion and interactivity: control of the relation of sensors to the environment. In order to feel immersed the user must be able to move around the virtual space and to apprehend it under various points of view. The computer tracks his movements and generates the sensory data corresponding to his position in a continuously shifting display. The control of sensors can go as far as a leaving the body, relocating the center of consciousness into foreign objects and exploring in this way places and

objects normally inaccessible to humans, such as the inside of a molecule, or the geography of a distant planet.

8. Insofar as immersion is "the blocking out of the physical world" (Biocca 25), it cannot be experienced if the user remains aware of the physical generator of the data, namely the computer. The "virtual reality effect" is the denial of the role of signs (bits, pixels, and binary codes) in the production of what the user experiences as unmediated presence. It is significant that Pimentel and Texeira title their first chapter "the disappearing computer": as in the *trompe-l'oeil* of illusionist art, the medium must become transparent for the represented world to emerge as real. VR represents in this respect the refutation of a popular myth: the personification of the computer as an autonomous mind (a myth fostered by artificial intelligence and its attempt to endow machines with creative thinking). As Brenda Laurel declares in a book stressing the need for aesthetic concerns in the design of software: "Throughout this book I have not argued for the personification of the computer but for its invisibility" (143). Jaron Lanier, a leading developer of VR systems, echoes: "With a VR system you don't see the computer anymore--it's gone. All that's there is you" (Lanier and Biocca 166). The disappearance of the computer--which constitutes the culmination of the trend toward increasing user-friendliness in computer design--requires the replacement of arbitrary codes with natural modes of communication. Binary coded machine instruction once gave way to the mnemonic letter-codes of assembly languages; assembly languages were in turn translated into high-level languages with a syntax resembling that of natural languages. Then arbitrary words were supplanted by the motivated signs of icons on the screen. When machines are enabled to respond to spoken commands, the keyboard will become superfluous. Next to go will be the screen and the sight of the machine: visual displays should occupy the entire field of the user's vision, rather than forming a world-within-the world, separated from reality by the frame of the monitor. Last but not least, language itself must disappear, at least in those areas where it can be more efficiently replaced by physical actions. In the ideal VR system the user will be able to grab and move objects, to mold them through the touch of the hand, or to change their colors with the stroke of a virtual paintbrush. In this mode of communication there will be no need for the user to translate her vision into sets of precise instructions. Purely visual thinking will be implemented by means of practical, non-symbolic gestures. As Pimentel and Texeira put it:

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        Simply, virtual reality, like
   writing and
        mathematics, is a way to represent
   and
        communicate what you can imagine
   with your
        mind. But it can be more powerful
   because it
        doesn't require you to convert
   your ideas into
        abstract symbols with restrictive
   semantic and
        syntactic rules, and it can be
   shared by other
        people. (17)
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The mystics of ages past (such as Swedenborg, an esoteric philosopher of the XVIIIth century) had a term for this radically anti-semiotic mode of communication. They called it "the language of the angels."

## Immersion and Literary Theory

9. Through its immersive dimension, VR inaugurates a new relation between computers and art. Computers have always been interactive; but until now the power to create a sense of immersion was a prerogative of art. It is significant that when attempting to describe the immersive quality of the VR experience, the advocates of the technology repeatedly turn toward a

metaphor borrowed from the literary domain:

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        For centuries, books have been the
   cutting
        edge of artificial reality. Think
   about it:
        you read words on a page, and your
   mind fills
        in the pictures and emotions--even
   physical
        reactions can result. (Wodaski 79)
        The question isn't whether the
   created world
        is as real as the physical world,
   but whether
        the created world is real enough
   for you to
        suspend your disbelief for a
   period of time.
        This is the same mental shift that
   happens
        when you get wrapped up in a good
   novel or
        become absorbed in playing a
   computer game.
        (Pimentel and Texeira, 15)
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10. The concept of immersion promoted by virtual reality bears thought-provoking affinities to recent theories of fiction based on the notions of possible worlds and of game make-believe. The possible-world theories of fiction come in many varieties (i.e. David Lewis, Umberto Eco, Lubomir Dolezel, Thomas Pavel) and I cannot account for all of them; the following discussion is mainly a synopsis of my own approach. Common to all theories, however, is a reliance on the semantic model of a set of possible worlds in which a privileged member is opposed to all others as the one and only actual world. The distinction actual/non-actual can be characterized absolutely, in terms of origin, or relatively, in terms of point of view. In the absolute characterization, the actual world is the only one that exists independently of the human mind; merely possible worlds are products of mental activities such as dreaming, wishing, forming hypotheses, imagining, and writing down the products of the imagination in the form of fictions. VR adds to this catalog of "accessibility relations" a mode of apprehension that involves not only the mind, but also the body. For the first time in history, the possible worlds created by the mind become palpable entities, despite their lack of materiality. The relative characterization of the concept of actuality--advocated by David Lewis--regards "actual" as an indexical predicate: the actual world is the world from which I speak and in which I am immersed, while the non-actual possible world s are those that I look at from the outside. These worlds are actual from the point of view of their inhabitants. Among the modes of apprehension that enable us to contemplate non-actual possible worlds, some function as space-travel vehicles while others function as telescopes. In the telescope mode--represented by expressing wishes or forming conjectures about what might have been--consciousness remains anchored in its native reality, and possible worlds are contemplated from the outside. In the space-travel mode, represented by fiction and now by virtual reality technology, consciousness relocates itself to another world, and recenters the universe around this virtual reality. This gesture of recentering involves no illusion, no forgetting of what constitutes the reader's native reality. Non-actual possible worlds can only be regarded as actual through Coleridge's much quoted "willing suspension of disbelief." The reader of a fiction knows that the world displayed by the text is virtual, a product of the author's imagination, but he pretends that there is an independently existing reality serving as referent to the narrator's declarations.

11. The notion of pretense and the related concept of game of make-believe forms the core of Kendall Walton's theory of fiction. According to Walton, a fictional text--as well as any type of visual representation--is a "prop in a game of make-believe" (11). The game consists of selecting an object and of regarding it as something else, usually in agreement with other players (author/reader, in the case of fiction.) Just as a stump may stand for a bear in a children's game of make-believe, the picture of a ship is taken for a ship, and the text of a novel is taken for an account of real facts (an account which may or may not be regarded as accurate, as the case of unreliable narration demonstrates). Players project themselves as members of the world in which the prop is a bear, a ship or a text of nonfiction, and they play the game by "generating fictional truths." This activity consists of imagining the fictional world according to the directives encoded in the prop. Some of the fictional truths concern the players themselves, or rather their fictional alter ego. The reader of a fiction does not simply generate truths of the type "p is fictional" but also "it is fictional that I believe p." And if p relates the pitiful fate of a character, it will be fiction al that the reader's alter ego pities the character. The emotions experienced in make-believe in the fictional world may carry over to the real world, causing physical reactions such as crying for the heroine. The affinity of Walton's theory of fiction with virtual reality and its concept of immersion thus resides in his insistence on the participation of the appreciator in the fictional world. It is truly a theory of "being caught up in a story."
12. Like computer-generated VR, possible-world and make-believe theories of fiction presupposes a relative transparency of the medium. The reader or spectator looks through the work toward the reference world. If the picture of a ship is experienced as the presence of a ship located in the same space as the viewer, it is not apprehended as "the sign of a ship." If readers are caught up in a story, they turn the pages without paying too much attention to the letter of the text: what they want is to find out what happened next in the fictional world. This reading for the plot focuses on the least language-dependent dimension of narrative communication. And if readers experience genuine emotions for the characters, they do not relate to these characters as literary creations nor as "semiotic constructs," but as human beings.
13. The literary devices which create a sense of participation in fictional worlds present many parallelisms with the factors leading to telepresence. One of the factors mentioned above was the projection of a three-dimensional environment. The literary equivalent of three-dimensionality is a narrative universe possessing some hidden depth, and populated by characters perceived as round rather than flat. By hidden depth I mean that the sum of fictional truths largely exceeds the sum of the propositions directly stated in the text. In a virtual world experienced as three-dimensional, the user knows that reality is not limited to what what can be seen from a given position: the outside conceals the inside, the front conceals the back, and small objects in the foreground conceal large objects in the background. Similarly, in a narrative world presenting some hidden depth (let us call it a "realistic world") there is something behind the narrated: the characters have minds, intents, desires, and emotions, and the reader is encouraged to reconstruct the content of their mind--either for its own sake, or in order to evaluate their behavior. The procedures of inference relating to inner life would be inhibited in the case of the referents of human names in lyric poetry or in some postmodern novels where characters are reduced to stereotypes, actantial roles or allegories. When the reader feels that there is nothing beyond language, inference procedures become largely pointless.
14. As is the case in VR systems, the reader's sense of immersion and empathy is a function of the depth of information. It is obvious that detailed descriptions lead to a greater sense of belonging than sketchy narration. This explains why it is easier be be caught up in a fictional story than in a newspaper report. But in purely verbal communication--in contrast with the visual or auditory domains--depth of information may reach the point of saturation and create an alienating effect: the length and minute precision of the descriptions of a Robbe-Grillet, as well as their restriction to purely

visual information, constitute a greater deterrent to immersion than the most laconic prose.

15. Breadth of information is not literally possible in fiction, since we are talking about writing and not about multi-media communication. But insofar as it relays sensations through the imagination, literary language can represent the entire spectrum of human experience. This ability of language to substitute for all channels of sensation is what justifies the comparison of literature with a multi-media mode of communication such as VR.
16. Another factor of immersion that seems at first glance impossible in textual communication is the control of the sensors. The reader only sees (hears, smells, etc.) what the narrator shows. But to the extent that the narrator's sensations become the reader's, fiction offers a mobility of point of view at least as extensive as that of VR systems. The development of a type of narrator specific to fiction---the omniscient, impersonal narrator--has freed fictional discourse from the constraints of real world and pragmatically credible human communication. The disembodied consciousness of the impersonal narrator can apprehend the fictional world from any perspective (external observer point of view or character point of view), adopt any member of the fictional world as focalizer, select any spatial location as post of observation, narrate in every temporal direction (retrospectively, simultaneously, even prospectively), and switch back and forth between these various points of view. Fiction, like VR, allows an experience of its reference world that would be impossible if this reference world were an objectively existing, material reality.
17. The ultimate freedom in the movement of the sensors is the adoption of a foreign identity. As Lasko-Harvill observes, "in virtual reality we can, with disconcerting ease, exchange eyes with another person and see ourselves and the world from their vantage point" (277). This "exchanging eyes with another person" is paralleled in fiction by the possibility of speaking about oneself in the third person, or of switching between first and third when speaking about the same referent. (Cf. Max Frisch, *Montauk*.) But there is an even more fundamental similarity between the role-playing of VR and the nature of narrative fiction. As authors strip themselves of their real world identity to enter the fictional world, they have at their disposal the entire range of conceivable roles, from the strongly individuated first person narrator (who can be any member of the fictional world) to the pure consciousness of the third person narrator.
18. Both VR and fiction present the ability to transcend the boundaries of human perception. Just as VR systems enable the user to penetrate into places normally inaccessible to humans, fiction legitimates the representation of what cannot be known: a story can be told even when "nobody lived to tell the tale." Of all the domain represented in fiction, no one transcends more blatantly the limits of the knowable than foreign consciousness. As Dorrit Cohn observes: "But this means that the special life-likeness of narrative fiction--as compared to dramatic and cinematic fiction--depends on what writers and readers know least in life: how another mind works, how another body feels" (5-6).
19. The effacement of the impersonal narrator and his freedom to relocate his consciousness anywhere, at any time and in whatever body or mind conveys the impression of unmediated presence: minds become transparent, and events seem to be telling themselves. The mobility of the sensors that apprehend fictional worlds allow a degree of intimacy between the reader and the textual world that remain unparalleled in nonfiction. Paradoxically, the reality of which we are native is the least amenable to immersive narration, and reports of real events are the least likely to induce participation. New Journalism, to the scandal of many, tried to overcome this textual alienation from nonvirtual reality by describing real-world events through fictional techniques. In the television domain, the proliferation of "docu-drama" bears testimony to the voyeuristic need to "be there" and to enjoy fiction-like participation, not only in imaginary worlds, but also in historical events.

## Against Immersion

20. Theories of fiction emphasizing participation in fictional worlds represent a somewhat reactionary trend on the contemporary cultural scene. Immersion in a virtual world is viewed by most theorists of postmodernism as a passive subjection to the authority of the world-designer--a subjection exemplified by the entrapment of tourists in the self-enclosed virtual realities of theme parks or vacation resorts (where the visitor's only freedom is the freedom to use his credit card). According to Jay Bolter, immersion is a trademark of popular culture: "Losing oneself in a fictional world is the goal of the naive reader or one who reads as entertainment. Its is particularly a feature of genre fiction, such as romance or science fiction" (155).
21. As we have seen above, the precondition for immersion is the transparency of the medium. But we live in a semiotic age, in an age that worships signs. Contemporary theories such as deconstruction teach us that the freedom of the mind must originate in a freedom from signs. So does virtual reality, in some respect, but while VR seeks this freedom in the disappearance of signs, contemporary cultural theories regard signs as the substance of all realities and as the prerequisite of thought. Freedom from signs cannot be achieved through their disappearance but only through the awareness of their omnipresence, as well as through the recognition of their conventional or arbitrary character. The aesthetics of immersion is currently being replaced--primarily in "high culture" but the tendency is now stretching toward popular culture--by an aesthetics of textuality. Signs must be made visible for their role in the construction of reality to be recognized. A mode of communication that strives toward transparency of the medium bereaves the user of his critical faculties. The semiotic blindness caused by immersion is illustrated by an anecdote involving the XVIIIth century French philosopher Diderot. According to William Martin, "he tells us how he began reading *Clarissa* several times in order to learn something about Richardson's techniques, but never succeeded in doing so because he became personally involved in the work, thus losing his critical consciousness" (Martin 58). According to Bolter, this l oss of critical consciousness is the trademark of the VR experience: "But is it obvious that virtual reality cannot in itself sustain intellectual or cultural development. . . . The problem is that virtual reality, at least as it is now envisioned, is a medium of percepts rather than signs. It is virtual television" (230). "What is not appropriate is the absence of semiosis" (231).
22. In reducing VR to passive immersion, however, Bolter ignores the second component of the VR experience. If contemporary art and literature are to achieve an enhancement of the reader's creativity, it should be through the emulation of the interactive aspect of VR, and not through the summary condemnation of its immersive power.

## Interactivity

23. Interactivity is not merely the ability to navigate the virtual world, it is the power of the user to modify this environment. Moving the sensors and enjoying freedom of movement do not in themselves ensure an interactive relation between a user and an environment: the user could derive his entire satisfaction from the exploration of the surrounding domain. He would be actively involved in the virtual world, but his actions would bear no lasting consequences. In a truly interactive system, the virtual world must respond to to the user's actions.
24. While the standard comparison for immersion derives from narrative fiction, the most frequently used metaphor of interactivity invokes theatrical performance. The simile captures a largely utopian dream of dramatic art: putting spectators on stage and turning them into characters:

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        As researchers grapple with the
   notion of
        interaction in the world of
   computing, they
        sometimes compare computer users
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to theatrical
audiences. "Users," the argument
goes, are
like audience members who are able
to have a
greater influence on the unfolding
of the
action than simply the fine-tuning
provided by
conventional audience response. .
. . The users of
such a system are like audience
members who
can march up onto the stage and
become various
characters, altering the action by
what they
say and do in their roles. (Laurel
16)

25. Whereas immersion may be a response to a basically static form of representation, interactivity requires a dynamic simulation. A simulative system does not simply respond to the user's actions by displaying ready-made elements, it creates its data "in real time" according to the user's directions. Like movies and narratives, a simulative system projects a world immersed in time and subjected to change, but while these media represent history retrospectively, fashioning a plot when all events are in the book, simulation generates events prospectively, without knowledge of the outcome. Taken as a whole, a simulative system does not reproduce a specific course of events, but like a "Garden of Forking Paths"--to parody the title of a short story by Borges--it is open to all the histories that could develop out of a given situation. Every use of the system actualizes another potential segment of history. The simulative system is like an alphabet containing all the books on a given subject, while the simulation itself is the writing of a potential book (except that there is no book left when the writing in completed). In a flight simulator, for instance, the user enacts the story of one particular flight out of a large set of possibilities by operating the keys that represent the control panel of the airplane.
26. The degree of interactivity of a VR system is a function of a variety of factors. Steuer enumerates three of them, without claiming that the list is exhaustive:

**speed**, which refers to the rate at
which
input can be assimilated into the
mediated
environment; **range**, which refers
to the
number of possibilities for action
at any
given time; and **mapping**, which
refers to the
ability of a system to map its
controls to
changes in the mediated
environment in a
natural and predictable manner.
(86)

The first of these factors requires little explanation. The speed of a system is what enables it to respond in real time to the user's actions. Faster response means more actions, and more actions mean more changes. The second factor is equally obvious: the choice of actions is like a set of tools; the larger the set, the more malleable the environment. A VR system allowing an infinite range of actions would be like real life, except that in real life our

choice of actions in a concrete situation is limit ed by pragmatic considerations. The factor of mapping imposes constraints on the behavior of the system. Insofar as "mapping" is defined in terms of natural response, it advocates the disappearance of arbitrary codes. Far from being associated with passive immersion, semiotic transparency is conceived by VR developers as a way to facilitate interactivity. The predictability of the response demonstrates the intelligence of the system. The user must be able to foresee to some extent the result of his gestures, otherwise they would be pure movements and not intent-driven actions. If the user of a virtual golf system hits a golf ball he wants it to land on the ground, and not to turn into a bird and disappear in the sky. On the other hand, the predictability of moves should be relative, otherwise there would be no challenge nor point in using the system. Even in real life, we cannot calculate all the consequences of our actions. Moreover, predictability conflicts with the range requirement: if the user could choose from a repertory of actions as vast as that of real life, the system would be unable to respond intelligently to most forms of input. The coherence of flight-simulation programs stems for instance from the fact that they exclude any choice of activity unrelated to flying. Meaningful interactivity requires a compromise between range and mapping and between discovery and predictability. Like a good narrative plot, VR systems should instill an element of surprise in the fulfillment of expectations.

## Interactivity and Literary Theory

27. Increasing the reader's participation in the creative process, and thereby questioning such distinctions as author/reader, actor/spectator, producer/consumer, has been a major concern of postmodern art. This does not mean that without these efforts reading would be a purely passive experience: theorists such as Iser or Ingarden have convincingly demonstrated that a world cannot emerge from a text without an active process of construction, a process through which the reader provides as much material as sh e derives from the text. But the inherently interactive nature of the reading experience has been obscured by the reader's proficiency in performing the necessary world-building operations. We are so used to playing the fictional game that it has become a second nature: as quasi native readers of fiction we take it for granted that worlds should emerge from texts. This explains why postmodernist attempts to promote active reader involvement in the construction of meaning usually take the form of self-referential demystification. As Linda Hutcheon writes: "The reader of fiction is always an actively mediating presence; the text's reality is established by his response and reconstituted by his active participation. The writer of narcissistic fiction merely makes the reader conscious of this fact of his experience" (141). The price of this consciousness is a loss of membership in the fictional world. In the narcissistic work, the reader contemplates the fictional world from the outside. This world no longer functions for the imagination as an actual world--this is to say, as an ontological center--but is expelled toward the periphery of the modal system, where it acquires the status of a non-actual possible world. The metafictional gesture of de-centering thus inverts a paradox inherent to fiction. Insofar as it claims the reality of its reference world, fiction implies its own denial as fiction. By overtly recognizing the constructed, imaginary nature of the textual world, metafiction reclaims our "native reality" as ontological center and reverts to the status of nonfictional discourse about non-actual possible worlds. In order to enhance participation in, or at least awareness of the creative process, the metafictional gesture thus blocks participation in the fictional world.
28. But the reader's interest is difficult to maintain in the absence of make-believe. The most efficient strategy for promoting an awareness of the mechanisms of fictionality is not to block access to the fictional world, but to engage the reader in a game of in and out: now the text captures the reader in the narrative suspense; now it bares the artificiality of plots; now the text builds up the illusion of an extratextual referent; now it claims "this world is

mere fiction." Shuttled back and forth between ontological levels, the reader comes to appreciate the layered structure of fictional communication, a layered structure through which he is both (in make-believe) narratorial audience in the fictional world, and authorial audience in the real world. One of the most successful examples of this game of in-and-out is John Fowles' *The French Lieutenant's Woman*. The fictional world may be eventually demystified as a textual construct, yet the text succeeds in creating an immersive experience. At times the reader regards the characters as human beings and invests an emotional interest in their fate; at other times he is made to acknowledge their status as literary creations. It is the memory of the immersive power of the text that engages his critical faculties during the self-reflexive moments. The object the reflexive activity is as much the phenomenon of immersion as the artificiality of fictional worlds. But if immersion alternates with an "interactive" stance toward the fictional world and the plural ontological levels embedded in the textual universe, the two experiences cannot occur at the same time. They imply mutually exclusive perspectives on the reference world.

29. When applied to traditional forms of text--that is, preserved and transmitted in book form--"interactivity" remains a largely metaphorical concept. It stands more for the reader's awareness of his collaboration with the text in the production of meaning than for personal initiative and decision making. Not surprisingly, the textual mode in which the ideal of interactivity comes closest to literal fulfillment is hypertext, a form of writing made possible by the electronic medium. The idea of hypertext is well-known and I will do no more than summarize it. Organized as a network of paragraphs connected by electronic links, hypertext offers at given points a choice of directions to follow. Each choice brings on the screen a different chunk of text, to which are attached new branching possibilities. Rather than consuming the text in a prescribed sequential order, the reader determines her own path of traversal through the textual network.
30. Through the initiative given to the reader, hypertext realizes a very basic form of interactivity. As Bolter observes: "The reader participates in the making of the text as a sequence of words" (158). If we equate "text" to one particular traversal of the network, then indeed every reading session generates a new text, and the reader takes an active part in this writing. In this view, "text" is not a static collection of signs but the product of a dynamic encounter between a mind and a set of signs. If the concept of text is indissoluble from the act of reading, the physical interactivity of hypertext is a concrete metaphor for the mental activity required by all texts. While every particular path of navigation through a hypertextual network brings to th e screen different chunks of text, every particular reading of a non-electronic text highlights different episodes, links different images, and creates a different web of meaning. The difference between the experiences of hypertext and of traditional text s is mostly a matter of intensity, of awareness and of having no other source of pleasure than what Nabokov calls "combinational delight" (69). In the absence of the distraction created by a dominating storyline, it is hoped that the reader will devote all of his attention to the tracking of links.
31. Alternatively, the concept of "text" could be equated to the sum of possible readings, or rather to the written signs forming the common source of these readings. In the case of hypertext, this would mean that the text is the entire network of links and of textual nodes. According to this view, the interactivity of hypertext is not a power to change the environment, as is the case in VR systems, but merely a freedom to move the sensors for a personalized exploration. The reader may choose in which order she visits the nodes, but her choices do not affect the configuration of the network. No matter how the reader runs the maze, the maze remains the same. Far from relinquishing authority (as Bolter has claimed), the author remains the hidden master of the maze. The reader's actions could only modify the environment if the hypertextual system generated text in real time, as an intelligent response to the reader's decisions."foot1[1] As I have argued above, this is what happens in simulative systems. The computer calculates the

position of the plane according to the user's input, rather than displaying a pre-calculated position. This will not happen in hypertext until it joins forces with AI--and until AI sharpens its story-generating capabilities. In the meantime, the closest to a hypertextual system operating in real time will be for the user to get on line with the author herself.

32. The fullest form of interactivity occurs when the reader is invited to contribute text to the network. "foot2[2] This invitation may take one of two forms. The first possibility is the user adding text and links which become permanent parts of the system. When this input concerns a specific character, the user is less playing the role of the character in question than taking over authorial responsibilities for the writing of his fate. In other words, the user manipulates the strings of a puppet, playing its role from the outside. The other conceivable form of interactivity is more like playing a game of make-believe such as cops and robbers. The system defines a cast of characters by specifying their attributes. The user selects an identity from this repertory, and plays the role from the inside. She encounters other users playing other characters, and they engage in a dialogue in real time. This dialogue does not count as description of the actions of the character b ut as performance of these actions: the character's freedom to act is a freedom to select speech acts. Of these two modes of contribution, only the second constitutes an immersive experience. The first may be addictive--as any game, any activity might be--but it maintains a foreign perspective on the fictional world.

## Immersion or Interactivty: The Dilemma of Textual Representation

33. Whether textual interactivity takes the weak form of a deliberate play with signs leading to a production of meaning, or the strong form of producing these signs, one consequence appears unavoidable: in literary matters, interactivity conflicts either with immersion or with aesthetic design, and usually with both. The strong forms of interactivity run most blatantly into the design problem: how can the contributions of the reader-turned-author be monitored by the system, so that the text as a whole will maintain narrative coherence and aesthetic value? An interactive system may be an alphabet for writing books, but the user should be prevented from producing nonsense. As Laurel argues: "The well designed [virtual world] is, in a sense, the antithesis of realism--the antithesis of the chaos of everyday life" (quoted by Pimentel and Texeira 157). Howard Rheingold stresses the need for "scenario control": "They [VR developers] want a world that you can walk around in, that will react to you appropriately, and that presents a narrative structure for you to experience" (307). The control of a pre-determined narrative script imposes severe limits on the user's freedom of moves (think of the narrow range of choices in the children's books "Choose Your Own Adven tures," where all the branches constitute a coherent story); but without this control the hypertextual network would turn into a multi-user word processor. In the worst case scenario, interactive fiction will be reduced to a bunch of would-be authors e-mailing to each other the fruits of their inspiration.
34. In the weaker forms of interactivity, design is easier to control, but immersion remains problematic. The reader of a classical interactive fiction--like Michael Joyce's *Afternoon*--may be fascinated by his power to control the display, but this fascination is a matter of reflecting on the medium, not of participating in the fictional worlds represented by this medium. Rather than experiencing exhilaration at the freedom of "co-creating" the text, however, the reader may feel like a rat trapped in a maze, blindly trying choices that lead to dead-ends, take him back to previously visited points, or abandon a storyline that was slowly beginning to create interest. The best way to prevent this feeling of entrapment, it seems to me, would be to m ake the results of choices reasonably predictable, as they should be in simulative VR, so that the reader would learn the laws of the maze and become an expert at finding his way even in new territory. But if the reader becomes an

expert at running the maze, he may become immersed in a specific story-line and forget--or deliberately avoid--all other possibilities. He would then revert to a linear mode of reading and sacrifice the freedom of interactivity.

35. It would be preposterous to pass a global judgment on the intrinsic merit of hypertext: whether the maze is experienced as a prison or as the key to freedom depends on the individual quality of the text and on the disposition of the reader. But I would like to advance one general pronouncement concerning the immersive power--or lack thereof--of the genre: a genuine appreciation of a hypertextual network requires an awareness of the plurality of possible worlds contained in the system; but this plurality can only be contemplated from a point of view external to any of these worlds.
36. The various attempts by contemporary literature to emulate the interactivity of VR thus involve a sacrifice of the special pleasure derived from immersion. The more interactive, the less immersive the text. The texts that come the closest to combining both types of pleasure are those that orchestrate them in round-robin fashion through a game of in-and-out. The textual incompatibility of immersion and interactivity can be traced back to several factors. While immersion depends on the forward movement of a linear plot, interactivity involves (and creates) a spatial organization. While immersion presupposes pretended belief in an solid extratextual reference world, interactivity thrives in a fluid environment undergoing constant reconfiguration. While immersion looks through the signs toward the reference world, interactivity exploits the materiality of the medium. Textual representation behaves in one respect like holographic pictures: you cannot see the worlds and the signs at the same time. Readers and spectators must focus beyond the signs to witness the emergence of a three-dimensional life-like reality.
37. In computer-generated VR, immersion and interactivity do not stand in conflict--or at least not necessarily. Immersion may offer an occasional threat to interactivity"foot3[3], but the converse does not hold. The more interactive a virtual world, the more immersive the experience. There is nothing intrinsically incompatible between immersion and interactivity: in real life also, the greater our freedom to act, the deeper our bond to the environment.
38. An obvious reason for this difference in behavior is the above-mentioned difficulty for texts to integrate the reader's input into a coherent narrative macro-structure. VR also experiences this type of problem when it attempts to turn users into the characters of a multi-media dramatic production. It is in very restricted domains regulated by narrowly defined "narrative" scripts--flight simulators, golf, paddle-ball, etc.--or in areas not subjected to the requirements of narrative logic--visual displays, or systems combining visual data with sound and dance--that VR systems achieve the most complete fusion of immersion and interactivity.
39. But there is a more fundamental reason for VR's ability to combine the two types of experience. In a textual environment, the tools of interactivity are signs. But signs are not the only mean of action. In the real world we can act with the body by pointing at things, manipulating them, and working on them with tools. We can also use the body as an instrument of exploration by walking around the world and moving the sensors. Virtual reality, as its developers conceive it, reconciles immersion and interac tivity through the mediation of the body. "Our body is our interface," claims William Brickemp in a VR manifesto (quoted in Pimentel and Texeira, 160). When the reader of a postmodern work is invited to participate in the construction of the fictional world she is aware that this world does not exist independently of the semiotic activity; hence the loss in immersive power. But the user of a VR system interacts with a world that is experienced as existing autonomously because this world is accessible to m any senses, particularly to the sense of touch. As the story of Saint Thomas demonstrates, tactile sensations are second to none in establishing a sense of reality. The bodily participation of the user in virtual reality can be termed world-creative in the same sense that performing actions in the real world can be said to create reality. As a purely mental event, textual creation is a

creation *ex nihilo* that excludes the creator from the creation: authors do not belong to the world of their fictions. But if a mind may conceive a world from the outside, a body always experiences it from the inside. As a relation involving the body, the interactivity of VR immerses the user in an world already in place; as a process involving the mind, it turns the user's relation to this world into a creative membership. The most immersive forms of textual interactivity are therefore those in which the user's contributions, rather than performing a creation through a diegetic (i.e. descriptive) use of language, count as a dialogic and live interaction with other members of the fictional world. I am thinking here of children's games of make-believe, and of those interactive hypertextual systems where users are invited to play the role of characters. These modes of interactivity have yet to solve the problem of design, but they point the way toward a solution of the conflict between immersion and interactivity: turn language into a dramatic performance, into the expression of a bodily mode of being in the world.

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# Notes

ref11. Some hypertexts erase certain pathways after the reader has taken them. This seems to be the closest so far to a self-modifying network responding to the user's input. But the pruning of links is pre-programmed into the text, so it does not constitute a response in real time.
ref22. This invitation is extended in "HotelMOO, the Hypertext Hotel" (originator and "proprietor": Tom Meyer of Brown university), a hypertextual network placed in the public space and accessible through the Internet. Users may either visit the hotel as anonymous guests, in which case their limited (inter)activity resides in the freedom to choose a path through the network, or they can enter the system under the identity of a specific character. In this case they are allowed to contribute to the expansion of the network.
ref33. Following McLuhan, Steuer suggests that the vividness of a virtual world may "decrease a subject's ability to mindfully interact with it in real time" (90). If a computer-generated environment is so rich in "fictional truths" that its exploration offers great rewards, why would the user bother to work on it?

# Works Cited

Biocca, Frank. "Virtual Reality Technology: A Tutorial." *Journal of Communication* 42.4 (1992): 23-72.
Bolter, Jay David. *Writing Space. The Computer, Hypertext, and the History of Writing*. Hillsdale, N.J.: Lawrence Erlbaum, 1991.
Cohn, Dorrit. *Transparent Minds: Narrative Modes for Presenting Consciousness in Fiction*. Princeton: Princeton UP, 1978.
Hutcheon, Linda. *Narcissistic Narrative. The Metafictional Paradox*.

Waterloo, Ontario: Wilfried Laurier UP, 1980.
Joyce, Michael. *Afternoon, a story*. Cambridge, MA: Eastgate Press, 1987. [Computer program].
Landow, George P. *Hypertext. The Convergence of Contemporary Critical Theory and Technology*. Baltimore and London: The Johns Hopkins UP, 1992.
Lanier, Jaron, and Frank Biocca. "An Insider's View of the Future of Virtual Reality." *Journal of Communications* 42.4 (1992): 150-172.
Laurel, Brenda. *Computers as Theater*. Menlo Park, Ca: Addison Wesley, 1991.
Lasko-Harvill, Ann. "Identity and Mask in Virtual Reality." *Discourse* 14.2 (1992): 222-234.
Lewis, David. "Truth in Fiction." *American Philosophical Quarterly* 15 (1978):37-46.
Martin, William. *Recent Theories of Narrative*. Ithaca and London: Cornell UP, 1986.
Nabokov, Vladimir. *Pale Fire*. New York: Random House (Vintage Books), 1989 [1962].
Pimentel, Ken, and Kevin Texeira. *Virtual Reality: Through the New Looking-Glass*. Intel/Windcrest McGraw Hill, 1993.
Rheingold, Howard. *Virtual Reality*. New York: Simon & Schuster, 1991.
Ryan, Marie-Laure. *Possible Worlds, Artificial Intelligence, and Narrative Theory*. Bloomington: Indiana UP, 1991.
Sheridan, Thomas B. "Musings on Telepresence and Virtual Presence." In *Papers from SRI's 1991 Conference on Virtual Reality*. Ed. Teresa Middleton. Westport and London: Meckler, 1992.
Steuer, Jonathan. "Defining Virtual Reality: Dimensions Determining Telepresence." *Journal of Communications* 42.4 (1992): 73-93.
Walton, Kendall. *Mimesis as Make-Believe. On the Foundations of the Representational Arts*. Cambridge and London: Harvard UP, 1990.
Wodaski, Ron. *Virtual Reality Madness*. SAMS publishing, 1993. [User manual for a computer game package]

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