

## The Interactive Potential of Distributed Networks.

### Immersion and Participation in Films and Computer Games

"The end of the illusion begins with the participation of the observer."<sup>1</sup>

Media artist Tom Sherman describes our contemporary mode of information reception thus: "People rarely choose to focus on one coherent stream of information these days, but rather gather data from multiple sources simultaneously. [...] We choose to compose our immediate information environment from multiple sources, mixing our multi-layered reality on the spot."<sup>2</sup> Overstimulation through media has conditioned our brain to constantly shift attention; our concentration span is decreasing all the time.

"This is also because we process information in ever smaller portions. If we were to process information in larger portions, we could decide to watch a film with a certain element of psychodrama in a certain processual mode. [...] But this is not possible if we are constantly shifting the focus of our attention. Information is now transmitted so that it can be processed by a brain conditioned to such constant shifts of attention. Our brain grows tired of switching channels, and so it is fed only small portions of information – for instance a short text followed by more action – so that it is never tempted to adjust to a single given mode."<sup>3</sup>

Thus a vicious circle is created, in which on the one hand the brain is forced to adjust to changes in its environment, and on the other this drop in attention level determines all future forms of information dissemination.

Interactive films and computer games obviously exploit the possibilities latent in such perceptual habits. In allowing the observer to participate directly in the action, they continually engage his interest. They seek to synthesize cinematic narration and the observer's capacity for interaction. Ever since the invention of the panorama, immersive visual spaces have striven to "put the observer in the picture" and stimulate the latter's participation. This short historical overview is intended to describe immersive strategies in cinema, ranging from the 360-degree panorama image to the creation of enterable virtual spaces – to date the limit of technological development. Enterable virtual spaces inevitably increase the observers' level of participation – they play an active role in the proceedings. Computer games also allow the creation of virtual worlds, into which the player can enter like an avatar. Although currently limited by the physical restraints of game consoles or PCs, players will be able, as online games develop, to create communal interactive spaces on the World Wide Web permitting them finally to break through the illusion

of participation and to participate fully in a "perfect illusion." Networked communities in virtual global space can already create real group experiences – in real time.

#### Immersion: From Panorama to Virtual Reality

In his book on virtual art, Oliver Grau describes how visual immersion strategies in computer-generated virtual reality developed from the panorama, one of the earliest forms of mass media.<sup>4</sup> The panorama is the most influential precursor of technologically produced illusory space, for it created a completely new sensation of three-dimensionality. It invited visitors to experience foreign lands simply by observing them, as it were submerging them in exotic landscapes. Later, cinema was to intensify the observer's illusion of being transported to faraway places. Early films exercised such suggestive power on cinema audiences that when a train appeared to rush out of the silver screen into the auditorium they would abandon their seats in panic. "If cinema ever could succeed in becoming the exact double of reality, it would also fail – since it would cease to exist as cinema."<sup>5</sup> Matthews wrote these words with reference to André Bazin and his 1946 text "The Myth of Total Cinema,"<sup>6</sup> in which Bazin argues in favor of a cinema that documents and represents reality – whose transparency would concomitantly entail a necessary break with illusion.

The history of the Hollywood dream factory is paradoxically marked by an increasing striving after realism, beginning with the introduction of sound and continuing with the transition from black-and-white to color film. Later developments designed to step up the assault on audiences' senses include enlarging the screen – from CinemaScope in the 1950s to IMAX in the 1980s – and OMNIMAX technology, not to mention Dolby Surround Sound. Yet attempts to stimulate the full range of the audience's senses to heighten the illusion of total submersion did not get far beyond the experimental stage. Smell-O-Vision (1960) involved pumping odors through pipes into the auditorium and releasing them during the film. 3-D spectacles were also used to heighten the illusion of visual depth. All these strategies to overcome the limits of the silver screen were designed to create as perfect an illusion as possible – to put the audience firmly "in the picture."

The first computer-graphics system, Sketchpad, developed by Ivan E. Sutherland in 1963, allowed users

1 Ursula Frohne, "That's the only now I get": Immersion und Partizipation in Video-Installationen," in *Kunst/Kino*, Georg Stemmrich (ed.), Oktagon, Cologne, 2001, p. 238.

2 Tom Sherman, <http://www.kunstradio.at/TEXTS/blanking-e.html>

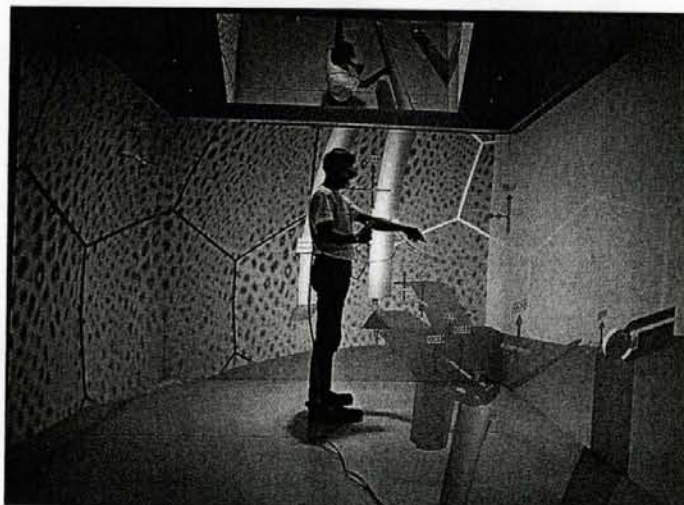
3 Detlef Linke, "Der letzte Mensch blinzelt. Ein Gespräch mit dem Hirnwissenschaftler Detlef Linke," <http://www.heise.de/tp/deutsch/inhalt/co/2000/1.html>

4 Oliver Grau, *Virtuelle Kunst in Geschichte und Gegenwart: visuelle Strategien*, Reimer, Berlin, 2001.

5 Peter Matthews, "André Bazin – Divining the real," <http://www.bfi.org.uk/sightandsound/archive/innovators/bazin.html>

6 André Bazin, "The Myth of Total Cinema," in *What is Cinema*, Hugh Gray (ed.), vol. 1, University of California Press, Berkeley, 1967, pp. 17–22.





The first European CAVE™ since 1996 at Fraunhofer IMK, Sankt Augustin  
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to directly manipulate images on the computer screen and to observe the results. In 1968, he also developed the Head Mounted Display (HMD) – a new kind of interface that facilitated interaction between observer and computer and opened up new possibilities for entering virtual worlds. The computer image's real-time reactions to the participant's own movements produce the illusion of the latter's really being "in the picture." This linking of action and reaction, stimulant and response, for the first time directly linked the participant's own imaginative reality and virtual reality.

In 1991, a new immersive projection technology called CAVE (Computer Aided Virtual Environment) was developed in Japan and the USA. It consists of a cube, onto whose walls and floor digital images are projected stereoscopically. The user is located within this illusory space and explores it with the help of stereo glasses and a hand-held interface. His head position – that is, his view of the projected scene – is taken into account in calculating the images, and he thus perceives them as almost perfect, three-dimensional illusions. High-performance computers such as those produced by Silicon Graphics are used to create these stereoscopic images.<sup>7</sup> CAVEs are designed for individual users who manipulate the projections themselves. A CAVE can hold more than one person, but as there is only one control device the others are merely observers rather than active participants. One creative example of applied CAVE technology is *The Living Web* (2002) by Christa Sommerer, Laurent Mignonneau, and Roberto Lopez-Gulliver, which demonstrates the information potential of the WWW. *The Living Web* records the conversations of visitors to this particular CAVE and converts them into a veritable flood of visual and acoustic data downloaded from the Internet. These data, which are constantly being generated anew, literally overwhelm the very people whose activity is sustaining this unstoppable stream of information.

The logical development of this technology is to project films directly onto the optic nerve, thus using the eye itself as an interface – the film would then be played only in the observer's head.

"If we succeeded in creating images directly within the eye itself, we could dispense with illusion-impairing optics and bulky HMDs. Since 1989, institutions such as the Human Interface Technology Lab, founded by Thomas Furness at the University of Washington in Seattle, have been working on a high-resolution laser microscanner

capable of projecting computer-generated

3-D images line-by-line directly onto the retina."<sup>8</sup> If the cinema screen is a window onto another world, in virtual reality the observer steps through this window into the world on the other side. Butakman describes the difference between virtual reality and cinema thus: "Virtual reality speaks to the desire to see the space of the computer [...] and to further figure it as a space one can move through and thereby comprehend."<sup>9</sup> Virtual reality seeks to create a synthesis of observer and computer-generated visual environment, converting data into sense experience. The distance between visual space and observer is abolished. The latter is now literally in the picture.

"Print, film and other mass media phenomena are purely aspersive in nature. They 'sprinkle' us with prefabricated information, scarcely permitting any form of interaction that might alter the text. Immersion takes place only in the head of the media user, and only as mental projection.

Performative immersion technology allows us not only to look through a window but also to open a door – to enter that other space, move freely around it, and alter it."<sup>10</sup>

Computer-generated environments for the first time permit both interaction with an illusory environment and control over its development. CAVE and similar immersive environments aim at creating virtual spaces that both submerge the observer and allow him to manipulate them via an interface.

Simulation technology is also used in the entertainment industry. Video and computer games, for instance, invite the user to enter a virtual world and explore it in a spirit of play. Here too, real-time response is necessary if the illusion to function properly. Computer games have pioneered immersive participation in cinematic story worlds. They have adapted the complex but familiar language of the cinema, which uses camera sequences, pans, zooms, editing techniques and changing angles and perspectives to create integrated story worlds. In computer games, the observers are also participants – it is they who keep the action going, as they navigate and explore pre-programmed space. The inclusion of strong narrative elements in computer games has made them a major entertainment form that many see as serious competition for cinema and TV. In contrast to the kind of total immersion that virtual reality aims at, computer games are a form of *ersatz* or surrogate reality whose illusionary character is obvious.

<sup>7</sup> See also: Erstes internationales CAVE-Festival 2002: Art of Immersion, 1. June–31. August 2002 in Bonn-Bad Godesberg, <http://www.cave-festival.de>

<sup>8</sup> Grau, op. cit., p. 125.

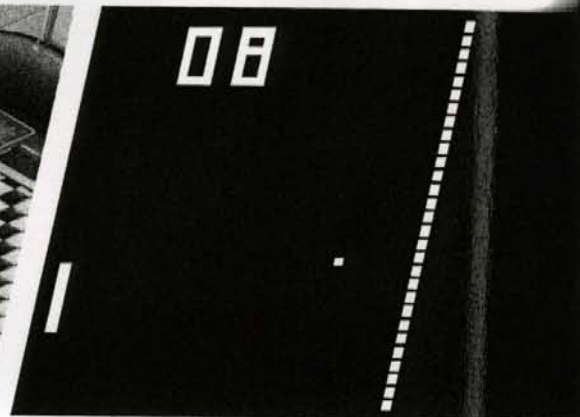
<sup>9</sup> Scott Bukatman, *Terminal Identity. The Virtual Subject in Postmodern Science Fiction*, Duke University Press, Durham/London, 1993, p. 200.

<sup>10</sup> Daniel Ammann, "Eintauchen in die Anderswelt," <http://www.dichtung-digital.com/2002/03-15-Ammann.htm>





The Sims  
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Pong  
screenshot  
© 1971, Atari

The first commercially  
successful video-game  
in history.

### From Video Consoles to Massive Multi-Player Online Worlds

The development of the multi-media entertainment industry ran parallel to that of the Internet, from the military-based ARPANET of the 1960s to today's global network. In 1972, Atari brought Pong onto the market, an electronic game best described as an abstract form of table tennis in which players propel a rectangle of light from one side of the screen to the other. Pong's simplicity and focus on interactivity, the way it reacted directly to players' input, made it a game culture classic and ensured its global success. Beside Pong, such video games as Pac Man (Namco, 1980), Tetris (1985) and Super Mario Bros. (Nintendo, 1985) scored significant successes in the mass-entertainment markets of the 1980s – one prime advantage being that they could be played in the privacy of the home. Rapid developments in the computer industry – faster processors and enhanced memory capacity – soon made it possible to create 3-D animations in real time, making the PC of the 1980s an ideal platform for games requiring high-quality graphics and ensuring it a permanent place in the entertainment industry.

The 1990s Internet boom generated text-based systems – MUDs (Multiple User Dungeons) and MOOs (MUDs, Object Oriented) – allowing the creation of networked games that exploited the global communication potential of the WWW. Texts were used to describe virtual computer worlds, into which users were invited to chat with each other.

Massive multi-player online worlds – the latest development in the world of computer games – are currently celebrating a global triumph. Dramatic increases in the Internet's data-transfer capacity and new methods of data compression have made it possible to access over the Net visual spaces composed of massive amounts of data – spaces that can be entered and refashioned by an almost limitless number of player-users. The first multi-location networked game was DOOM, a classic of its kind whose cult status is ensured for years to come. Developed in 1994 by ID-Software, DOOM owes its success to the fact that the players themselves are able to modify the game as they play it: they can create new levels as well as design new weapons and enemies. DOOM is also the first game in which up to eight players can compete

against each other simultaneously online; it has inspired a whole generation of net-based games that include Diablo (Blizzard Entertainment, 1996) and Ultima Online (Electronic Arts Square / Origin, 1997), followed later by Quake and Quake III Arena (ID-Software, 1996–2000). These game engines allow networked players to interact with each other in real time. In these first-person shooters it is easy to recognize whether one's opponent is real or computer-generated, since real players have a far less predictable range of possible reactions at their disposal. Bots – artificial intelligence modules – built into the game constantly adapt the action to the players' skill level. If the players' interest in the game begins to wane, the bots increase the level of difficulty, thus ensuring that things never get boring.

### Non-linear Narrative Structures in Computer Games

DOOM was the first game to use a genuinely realistic "subjective camera" to simulate autonomous motion through a virtual world. A first-person shooter such as DOOM is thus defined as three-dimensional graphic action game computed in real time from the perspective of a (virtual) subjective camera. The player slips into the hero's body and sees the surroundings, his enemies and the hero himself from the latter's perspective. This so-called third person 3-D perspective is derived from cinema – at least in this respect computer games and classical Hollywood cinema have something in common. Hans Peter Schwarz has pointed out that video games were the first medium to combine the potential of computers and TV: "Digital television and interactive film would certainly not have become the focus of attention of the media-market strategists if there had not been such an enormous demand for interactivity – however rudimentary – by the users who have grown up with video games and who are now into the second or third generation."<sup>11</sup>

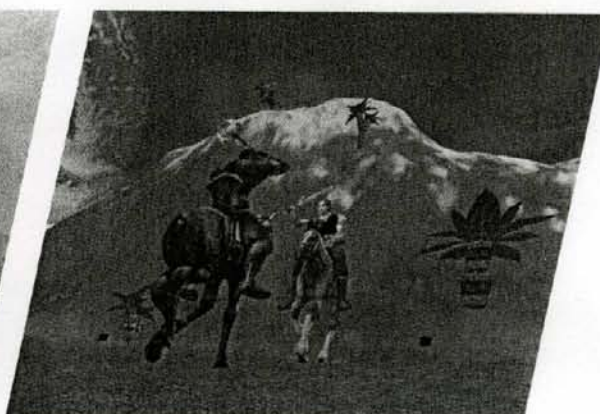
This combination of narration and interaction has ensured the continuing attraction of computer games: "Computer games almost inevitably combine narrative progression with 'virtual' sensory pleasures. Repeatedly, the operations of narrative will be shown to constrain the effects of a new mode of sensory address, and so the fascination with the rise of virtual reality systems might represent a possible

<sup>11</sup> Media – Art – History, Hans-Peter Schwarz (ed.), Prestel, Munich, 1997. This book was published on the occasion of the opening of the Media Museum, ZKM | Center for Art and Media Karlsruhe on October 18, 1997.





Lara Croft, Tomb Raider  
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passage beyond narrative into a new range of spatial metaphors.<sup>12</sup> Participation on the level of narration always involves a disruption of the narrative structure. Interactivity or participation necessarily entails a loss of quality with respect to the illusion of being submerged in another world – but also a more active level of player participation. These increasingly more realistic computer games are becoming serious competitors to cinema. Gundolf S. Freyermuth sees cinema's loss of social significance in terms of its shrinking economic status: "American consumers now spend more money on digital hard- and software than they do on cinema visits, video recorders and TV sets. In 1999, for the first time interactive video and computer games had a higher turnover than did passive cinema, thus emulating the theme park industry, which has long since surpassed cinema in economic terms. New high-tech genres are being developed both off- and online that will soon replace cinema in terms of mass-media popularity."<sup>13</sup> Hollywood has reacted to this threat by producing film versions of such popular computer games as *Tomb Raider* (1996) and *Final Fantasy* (1990). But these reproductions of game worlds on the silver screen do not work, for the simple reason that the games' decisive characteristic – their participative potential – cannot be emulated in the cinema version. The imaginative world of the film version is severely limited compared to that of the game version, and the former has therefore enjoyed only limited success. Hollywood cinema remains trapped in the tradition of illusory spaces that per se exclude participatory strategies, for participation destroys the perfection of the illusion. On the other hand, some games are based on successful films, such as the multi-player online world of *Star Wars Galaxies*, scheduled to be launched in 2003: "Perhaps the most extreme example of front-loaded game design is the forthcoming multi-player online world based on *Star Wars*, which is being built by Verant, the leading developer in this genre, and LucasArts. When it is launched in 2003, *Star Wars Galaxies* is expected to attract more than a million subscribers – based on Everquest's usage statistics, that means more than 300,000 simultaneous players at peak usage."<sup>14</sup> These game worlds based on successful films extend the latter's linear plot to create their own autonomous "universes."

In recent years, a similar strategy has been followed by certain films that experiment with narrative options and the dissolution of narrative linearity. For instance in *Living in Oblivion* (1995, dir. Tom DiCillo) a single filming session is narrated from the perspectives of all those involved, whereby each new scene is actually being dreamt by one of the protagonists – a fact that becomes apparent only in the course of the film. *Sliding Doors* (1998, James Berardinelli) and *Run Lola Run* (1999, Tom Tykwer) also present the viewer with alternative versions of the same plot. These disruptions of narrative structure and concomitant confrontations with a range of narrative choices break, as it were, the fictional spell. Game designer Katie Salen has pointed out that the "language and style of game media have had a tremendous influence on recent film direction and camera movement."<sup>15</sup> *The Matrix* (1999, Andy and Larry Wachowski) is a striking example of such a film.

But back to games: in recent years computer games have increasingly emphasized narrative, which was of but secondary importance in ego-shooter games. *Half-Life* (Valve/Sierra Studios, 1998) – another three-dimensional first-person shooter, whose technology is based on Quake Engine – involves the player in an interactive narrative plot structure. Frank Furtwängler describes the communication model of games as that of a socially interactive conversation, in contrast to a preordained story.<sup>16</sup> "All in all, computer games are located between (at least) two poles of tension, defined by the categories interactivity and narrativity."<sup>17</sup>

Today real-time strategy games such as *Command and Conquer* by Westwood Studios (1995), *Starcraft* by Blizzard North (1998), and first-person shooters (FPS) such as *Quake* and the more advanced version *Quake III Arena* (ID-Software, 1996–2000) enjoy great popularity. Another example of an online game in a networked virtual world is the *Sim City* series (1989) created by Will Wright; the latest version, *The Sims*, was released in 1998. Players remain involved in such games for much longer periods than is the case with FPS games. They play not for a matter of hours but for weeks or even months. Collaborative elements and built-in feedback mechanisms ensure that the players' interest never wanes. Players who re-enter the game after a lengthy absence may find that

<sup>12</sup> Bukatman, op. cit., p. 195.

<sup>13</sup> Gundolf S. Freyermuth, "Von A nach D. Zwischen Hype und Utopie. Am Horizont der Digitalisierung von Kunst und Unterhaltung lockt das Holodeck," in *Cyberhypes. Möglichkeiten und Grenzen des Internet*, Rudolf Maresch and Florian Rötzer (eds.), Suhrkamp, Frankfurt/M., 2001, p. 225.

<sup>14</sup> J.C. Herz, "Gaming the System. Multi-Player Worlds Online," in *Game On. The History and Culture of Video-games*, Lucien King (ed.), King Publications, London, 2002, p. 87. See also <http://starwarsgalaxies.station.sony.com/>

<sup>15</sup> Katie Salen, "Telefragging Monster Movies," in King, op. cit., p. 99.

<sup>16</sup> Frank Furtwängler, "A crossword at war with a narrative Narrativität versus Interaktivität in Computerspielen," in *Formen interaktiver Medienkunst*, Suhrkamp, Frankfurt/M., p. 398.

<sup>17</sup> Furtwängler, op. cit., p. 374.





entire settings have been altered in the mean time by interaction between other players – so there's always something new to discover. The game's ambience is created and controlled by the players themselves – in *The Sims*, some ninety percent of the ambience is now produced by the player population.<sup>18</sup>

In multi-player online worlds such as *Everquest* and *The Sims*, the virtual world does not disappear when players leave the game but is continually being modified in their absence by other players or by automated processes built into the game. The virtual world of these games is thus dynamic, unpredictable, and fascinating. A further development of these computer games is *Machinima*, in which a film is projected in a virtual 3-D environment generated in real time. Currently, most of these films are created by the players themselves – the user thus becoming producer. Based on already existing game engines such as *Quake* and *Quake III Arena*, they allow the creation of personalized multi-player online worlds, “a strange universe recorded in pixels per second distributed and consumed via the web.”<sup>19</sup>

#### Participation in Interactive Films

In interactive films, which permit the observer to determine the actual plot of a story via tracking systems and sensors – or in comparable computer games – the observer/player's involvement in the visual experience is enormously increased.

“But the mass of mainstream film, and the conventions within which it has consciously evolved, portray a hermetically sealed world which unwinds magically, indifferent to the presence of the audience, producing for them a sense of separation and playing on their voyeuristic fantasy. Moreover, the extreme contrast between the darkness in the auditorium (which also isolates the spectators from one another) and the brilliance of the shifting patterns of light and shade on the screen helps to promote the illusion of voyeuristic separation.”<sup>20</sup>

In a traditional film, the position of the observer is determined by the latter's immobility vis-à-vis the cinema screen. The cinematic experience is one of “emotional immersion.”<sup>21</sup> Should the viewer become an “emotional observer,”<sup>22</sup> he breaks through the perfect illusion of the cinematic space. The digital storage capacity of modern computers allows data to be made available in non-linear structures, permitting external users to access it in apparently limitless permutations. The Internet with its ever-growing

global networks has also generated a concomitant growth in interactive group projects.

“As soon as the Internet's capacity for transmitting data reaches a certain level, visual spaces will be accessible online of a quality that is currently to be found only in complex installations – in stand-alone systems at festivals or in museums – that explicitly recommend themselves as models for future Internet creations. Thus installations have been created with new interfaces that not only place the observer much more intensely in the picture but – through an extensive range of interactive processes – permit him to become much more involved in the work's evolution.”<sup>23</sup>

Interactive cinema is thus the cutting edge of our “multimedia reality,”<sup>24</sup> using the Internet to offer a whole new range of narrative options in networked virtual worlds. One of the earliest examples of an interactive film with a non-linear plot is Lynn Herschman's *Lorna* (1979–1984). The eponymous heroine is a woman living alone in her apartment, cut off from the outside world – with the exception of her telephone and TV set – and suffering from loneliness and despair. Using a remote control, the installation visitor can direct Lorna's actions and thus determine the outcome of the story. The work was published as a videodisc consisting of thirty-six sequences lasting from a few seconds to several minutes. The CD-ROM, created as an interactive medium for the mass market at the beginning of the 1990s, proved to have insufficient data capacity for video stories of any length. Only with the advent of the DVD did a mass medium appear with sufficient capacity for sustained interactivity.

Another example of interactive cinema is *Artificial Changelings* (1993–1998) by Toni Dove, in which the observer controls the plot development. However, the range of options is limited, and in any case predetermined by the computer. Yet the direct link between observer in real space and actor in the film generates an entirely new level of participation. Dove has created her works both as enterable installations, in which interaction takes place via motion tracking and pressure-sensitive sensors, and as DVD presentations on a computer monitor, in which interaction takes place via the keyboard or a microphone using voice recognition.

*Desert Rain* (1999) by the Blast Theory group unites the potential of an interactive installation with the instructional mode of a computer game. The game is set up like an installation, a virtual

<sup>18</sup> Herz, op. cit., p. 91.

<sup>19</sup> Salen, op. cit., p. 99.

<sup>20</sup> Laura Mulvey, “Visual Pleasure and Narrative Cinema,” in *Narrative, Apparatus, Ideology: A Film Theory Reader*, Philip Rosen (ed.), Columbia University Press, New York, 1986, p. 201.

<sup>21</sup> Marie-Laure Ryan, *Narrative as Virtual Reality: Immersion and Interactivity in Literature and Electronic Media*, Johns Hopkins University Press Baltimore, 2001, p. 148 ff. Quoted in Daniel Ammann, “Eintauchen in die Anderswelt,” <http://www.dichtung-digital.com/2002/03-15-Ammann.htm>

<sup>22</sup> Annette Hünnekens, *Der Bewegte Betrachter: Theorien der interaktiven Medienkunst*, Wienand, Cologne, 1997.

<sup>23</sup> Oliver Grau, “Kunst als Inspiration medialer Evolution,” <http://waste.informatik.hu-berlin.de/mtg/mtg4/grau.html>

<sup>24</sup> See also Manfred Fasser, *Cyber-Moderne. Medienrevolution, globale Netzwerke und die Künste der Kommunikation*, Springer, Vienna, New York, 1999.





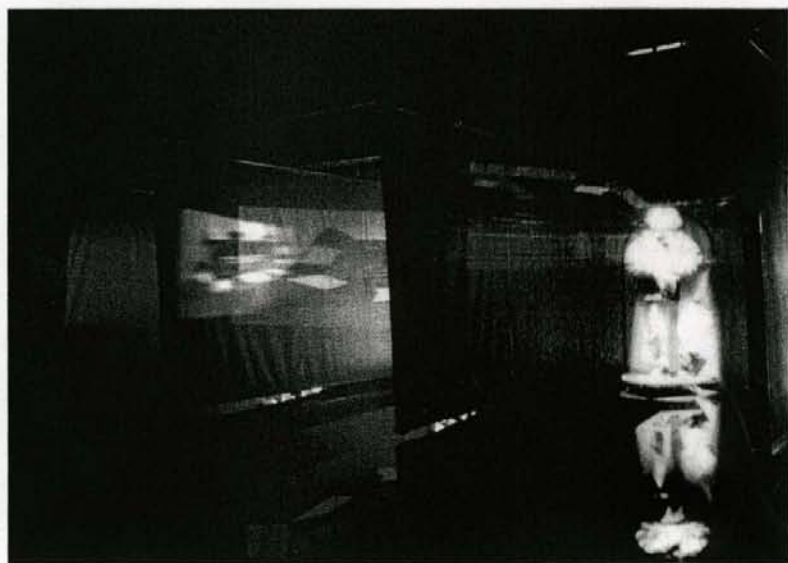
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Lynn Herschman Leeson  
Lorna  
1979-1994  
interactive environment  
screenshot  
ZKM | Media Museum,  
Karlsruhe  
© Lynn Herschman Leeson



LAN party at ZKM | Center  
for Art and Media Karlsruhe  
(during the exhibition  
"net\_condition," 1999)  
photo © Franz Wamhof



Blast Theory  
Desert Rain  
1999  
VR environment for performance  
installation view  
ZKM | Center for Art and Media  
Karlsruhe, 1999  
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photo © Franz Wamhof

environment in which six participants have to orient themselves. Only by communicating with each other can they successfully navigate their way through this virtual world. *Desert Rain* was first presented at the ZKM | Center for Art and Media Karlsruhe in 1999. Blast Theory locates the user in an environment which is structured by cooperation and specific rules of conduct. The six participants stand in separate cubicles with pressure sensitive floors, through which they control their movements in this virtual world. Stranded in a desert landscape dotted with underground bunkers, they have half an hour to find their goal and complete their mission. The better they communicate and cooperate, the more easily they can find their way through this virtual world, thus making this virtual adventure a real collective experience.

Players are motivated by competition – every game has a winner and several losers. Interaction in networked games, however, offers more than mere point

scoring – it offers the added dimension of social communication. Players exchange information on technical support and other game-related matters; they also establish personal contact via e-mail. Indeed, sometimes players spend more time discussing and developing games than in actually playing them. Development in strategy-based and multi-player on-line worlds is not a case of overcoming geographical obstacles but of developing one's own game avatar. Online computer games are becoming increasingly popular – especially in the form of LAN parties, networked game marathons in which transmission speeds between computers are many times faster than in Internet communication. Networked virtual worlds facilitate participation in distributed networks and are an important step towards the vision of total media convergence on the Net.

Translated from the German by Stephen Richards