FROM MULTIUSER ENVIRONMENTS AS (virtual) SPACES TO (hybrid) SPACES AS MULTIUSER ENVIRONMENTS

Nomadic technology devices and hybrid communication places

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ABSTRACT

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This dissertation addresses how mobile communication technologies, with a focus on cell phones, have an active role in creating new types of communication and social networks in a hybrid space formed by the blurring of borders between physical and digital spaces. It analyzes the transference of social places from cyberspace to hybrid spaces. Nomadic technology devices are responsible for producing new social networks in a space that interconnects the physical and the virtual due to their users' perpetual mobility. During the last decade, multiuser environments in cyberspace have frequently been regarded as utopian spaces in which users could project their imagination. Moreover, digital spaces have been considered as essentially disconnected from physical spaces. Nowadays, the constant connection to virtual spaces, allowed by new mobile communication technologies, transforms our social spaces, as well as the projection of our imaginary places in urban spaces. This research is based on theoretical and practical studies. First, I analyze the existing literature on cyberspace and mobile technology devices, emphasizing concepts such as virtual, cyberspace, immersion, and hybrid. Practical aspects include analysis of current practices, via interviews with artists and scholars and an Internet survey applied in the United States and in Brazil.

LIST OF SIGLA AND ABBREVIATIONS

2G	=	Second Generation Cellular System
2,5G	=	Second Generation and a Half Cellular System
3G	=	Universal Mobile Telecommunication System
AR	=	Augmented Reality
CDMA	=	Code Division Multiple Access
FCC	=	Federal Communications Commission
GPS	=	Global Positioning System
GSM	=	Global System for Mobile Communication
GPRS	=	General Packet Radio Service
GUI	=	Graphic User Interface
HMD	=	Head Mounted Display
HUD	=	Head Up Display
HTML	=	HyperText Markup Language
HTTP	=	HyperText Transfer Protocol
J2ME	=	Java 2 Platform Micro Edition
MMORPG	=	Massively Multiplayer Online Role Playing Game
MMS	=	Multimedia Message Service
MR	=	Mixed Reality
MOO	=	Multi-User Dungeon, Object Oriented
MUD	=	Multi-User Dungeon, ou Dimension
NTD	=	Nomadic Technology Devices
PARC	=	Palo Alto Research Center (Xerox)
PDA	=	Personal Digital Assitant
SMS	=	Short Message Service
TDMA	=	Time Division Multiple Access
VR	=	Virtual Reality
VRML	=	Virtual Reality Modeling Language
WML	=	Website META Language
WWW	=	World Wide Web

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INTRODUCTION

The move from multiuser environments as (virtual) spaces to (hybrid) spaces as multiuser environments means that online social communities, in which members do not occupy the same contiguous space, can now also be formed in physical spaces, with the aid of nomadic technology devices. Mobile communication technologies, specifically cell phones, have an active role in creating new types of communication and social networks in a hybrid space formed by the blurring of borders between physical and digital spaces. Assuming that every reality is constructed by mediation, I believe that our experience of space depends both on our cultural practices as well as on the techniques we develop.

Multiuser environments in cyberspace have frequently been regarded as utopian spaces in which users could project their imaginary selves. How are imaginary places redefined when communities are shaped in a hybrid space? What does a hybrid multiuser environment mean, since it carries elements from both digital and physical spaces? The passage from cyber to hybrid is mediated by means of arts and games, traditional places for projections of the imagination. Furthermore, nomadic technology devices strongly influence both, bringing (media) arts and (pervasive) games into urban spaces. As a result, arts and games are also responsible for creating sociability in hybrid spaces, merging imaginary and real spaces. The emergence of location-based mobile games is an example of this tendency, as well as media arts projects which intervene in public spaces. This book aims to bring the awareness that the digital has never been separated from the physical, and it is an essential element for promoting sociability and nourishing imagination in urban spaces.

The first part of this book is dedicated to conceptualizing cyberspace as an immaterial information space. The Internet is analyzed as a gathering and communication place, as well as a space in which users project their unrealistic libertarian desires, since it was considered an immaterial space, not restricted by physical laws. Social multiuser environments are also addressed as former projections of imaginary spaces. Online MUDs were considered spaces of liberty and potential places to develop new types of sociability. During the last decade, it was common to believe that the Internet could be the ideal (non)place for community development, as long as users believed they could create new identities and travel around the world without moving physically. Furthermore, the possibility of communicating across great distances eliminated fears and shyness related to face-to-face communication. Case studies of how art and games were developed in digital spaces are important to support the idea of multiuser environments as ludic and liberty places. It is interesting to notice, however, that there has always been a tension between both—games could not be considered art and vice versa.

There are many histories of the Internet. The computer network that started to develop in the late sixties had already been used as a remote access to information, as a faster and more efficient way of sending (electronic) mail, as an information display, as a commercial environment, as a *space of flows*, and also as a social place. I do not intend to tell another story of the Internet as a social place. Nor is my goal to recreate the history of the Internet as a technological phenomenon. Rather, I focus on the development of the concept of cyberspace as synonymous to the Internet. In this context, I show how this concept has been internalized in people's minds, transforming the Web in an immaterial information space. The definition of the Internet as a mediated space as well as the development of innumerous material interfaces demonstrate the oddness of perceiving digital space as an immaterial instance. Another important belief in the 1990s was the general perception of cyberspace as a virtual and simulated space, which contributed to create the illusion of the virtual city and the virtual body. How does the idea of simulated environments contribute to disconnect the concepts of physical and virtual, making people imagine that they could develop a whole new type of sociability on the Web?

The second part of this work defines hybrid spaces in the light of the emergence of mobile computer interfaces. Moreover, it addresses how cell phones as nomadic technology devices are used with different purposes in distinct parts of the world (Rio de Janeiro, Los Angeles, Helsinki, and Tokyo), emphasizing mobile phones as creators of sociability in an enfolded space. The last chapters are dedicated to media arts and mobile games. Art in the 21st century employs mobile technology and pervasive computing to redefine urban spaces and to create new social environments. A similar goal is accomplished by the use of cell phones in pervasive gaming, creating new communities and a new understanding of the city space. In short, I intends to investigate how the paradigm of "communities in non-contiguous spaces" moves from the Internet to physical spaces, creating a new perception of the city, as well as new types of interaction among citizens.

The first chapter defines cyberspace in light of the two concepts that compose the word: *cybernetics* and *space*. Cybernetics was the science created by Norbert Wiener, Claude Shannon, and other intellectuals during the Macy's Conferences in the 1950s, which conceptualized information as an immaterial entity, disconnected from the material interfaces which supported it. When William Gibson (1984) coined the word "cyberspace" to describe an information space, he was clearly referring to the immateriality that the concept originally suggested. Conversely, this chapter focuses on the material interfaces that allow our connection to digital spaces, emphasizing that cyberspace is indeed material and its perception is modified by the interfaces that mediate our connection to it. The installation **~~database~~**, a collaboration with media artist Fabian Winkler, exemplifies the importance of material interfaces when interacting with digital spaces. **~~database~~** inverts the meaning of traditional computer interfaces thus promoting a different "reading" of digital technologies. The concept of cyberspace, besides being a descendant of *cybernetics* and *space*, means a simulated world of information. The idea of simulation in the "immaterial" and "virtual" space of computers has also been applied to living beings, influencing our perception of cyberspace as disconnected from physical space.

After the emergence of the concept of cyberspace, the word "virtual" has frequently been applied to describe simulated worlds constructed by digital technology. The idea of virtual reality in fact appeared with the first flight simulators in the 1970s.[1] However, as long as nomadic technologies and ubiquitous computing acquire visibility, virtual can no longer be regarded only as a simulation. Moreover, in everyday parlance, virtual is frequently referred as the opposite of real. As the concept of hybrid space includes the concept of the virtual, I felt the necessity of including a chapter to clarify what virtual means in the scope of this book. **Defining virtual** presents different philosophical approaches to the concept of the virtual and their relationships to the concept of cyberspace. Chapter 2 discusses virtual by means of four main concepts:

[1] A detailed history of flight simulators can be found at: Grupping, Jos. Flight Simulator History. Available at: http://simflight.com/~fshistory/fsh/versions.htm. Accessed on: 28 Nov. 2003.

simulation, possibility, potentiality, and non-place. The last two concepts are related to hybrid spaces created by nomadic technologies.

The third chapter defines multiuser environments as spaces. It presents MUDs as social, imaginary, and virtual spaces. First, I contextualize social (or Tiny) MUDs inside the history of games and maps. Then it focuses on the construction of imaginary spaces as instances that have been created outside physical known spaces. Online multiuser environments, as parts of cyberspace, have been regarded as perfect places for projections of imaginary selves and spaces. MUDs represented freedom and liberty from the physical body and from the physical. However, MUDs never really accomplished this goal, mainly because they had never been in fact disconnected from physical space. Finally, MUDs as virtual spaces represent simulations of spaces and simulations of the body. In this chapter, I also introduce the idea, originally explored by Manuel Castells (1996) and later by Kevin Kelly (1999), that places are losing their material references and migrating to an immaterial information space, defined by networks and connections. Yet they also argue that people will always inhabit places, and communities will continue to be formed in physical spaces. I recapture this idea in chapter 5, arguing that communities move from information/immaterial spaces into hybrid spaces.

Finally, I end this first part with case studies of virtual multiuser environments that combine art and games, like **Imateriais**, produced by Jesus de Paula Assis, Ricardo Ribemboim, Celso Favaretto, Ricardo Anderáos, and Roberto Moreira in 1999 (Brazil). I then go back in time to a period before the WWW, trying to find in the telepresence art the seed of hybrid spaces, previous to nomadic technologies. This search leads to early artistic experiments using telephones as interfaces, as well as satellite-mediated projects, like Kit Galloway and Sherrie Rabinowitz's **Hole in Space** (1980).

The second part begins with the definition of hybrid spaces. Hybrid space is conceptualized in opposition to virtual, augmented, and mixed realities. Hybrid space is defined by the merging or the blurring of borders between physical and virtual spaces. Hybrid spaces are nomadic spaces, created by the constant mobility of users who carry portable devices continuously connected to the Internet. However, hybrid spaces are not synonymous with the Internet, as cyberspace has frequently been. Hybrid spaces are created by the enfolding of distant contexts into the present context, and by the unpredictability contained in actions derived from the mobility of connected users in physical spaces. Therefore, they are related to the idea of non-presence and potentiality, rather than simulation. Hybrid space inhabitants generally use mobile and wearable devices in their everyday lives, roaming over the same urban space or territory, instead of going on an endless journey. In this sense, the idea of hybrid space is best connected to the concept of nomadic spaces, as defined by Deleuze and Guattari (1997, p. 380). Moreover, *hybrid* calls our attention to the fact that cyberspace, or digital space, has never been disconnected from physical space. Historical facts have contributed to this approach, but now nomadic technologies and pervasive computing show us that digital spaces can be easily integrated into everyday life. One must not leave or disconnect from physical space in order to connect to digital spaces. The virtual in this sense means a universe of potentialities created by the enfolding of distant contexts into the present context, in an "in between" time and mobile space. Finally, this chapter focuses on the movement from places to spaces, and then toward hybrid spaces: how communication spaces have been displaced by the emergence of advanced transportation technologies, partially migrating to digital spaces; and how they now connect places and spaces, moving toward the hybrid space.

In chapter 1 interfaces of immateriality were called the material interfaces used to connect to digital spaces. In chapter 6, I name **interfaces of the hybrid** the devices used to mediate our connection to hybrid spaces. Interfaces of hybrid spaces are nomadic, wearable, and ubiquitous computers. Here the focus migrates to cell phones as specific mobile technologies that change the experience of space and influence sociability in hybrid spaces. Then I explore some possible consequences of the use of nomadic interfaces, such as (1) repositioning imaginary spaces by enfolding distant contexts into the present context, and (2) transforming the experience of space by blurring the borders between physical and virtual, and public and private, and allowing the possibility of micro- and macro-coordination among its users. Lastly this chapter points to future developments of mobile interfaces, when cell phones will no longer be viewed merely as mobile telephones, but as multimedia devices, remote controls, game consoles, and mainly as social technologies.

Chapter 7 focuses on perceptions of the self, defined by specific places. Cell phone usage differs substantially depending on where one is in the world. In **Cell phones and places** I compare the mobile user populations of Finland and Japan to the user in Brazil and in the United States. Also the chapter analyzes why mobile technology is so embedded in the Japanese and Finnish cultures, and so disconnected from the American and Brazilian cultures. Mobile phones are popular items in all four countries, but the ways in which the interface is used are completely different. In Finland and Japan mobiles can be considered social devices.

Chapter 8 is dedicated to media arts and transformations of the contemporary subject through art. It studies how cell phones and pervasive computing change physical space by bringing communication and interaction to former neutral and circulation spaces. It addresses how art mediated by technology changes both museum spaces and public urban spaces. The exhibition *nano*, produced by a group at UCLA leaded by Victoria Vesna, Jim Gimzewski, and Katherine Hayles, and LACMALab (Los Angeles County Museum of Art, Boone Children's Gallery), is an example of the former case. The second case is exemplified by pieces that employ cell phones as artistic interfaces. At this point it is interesting to realize that the ostracism of telephones as artistic interfaces mentioned in chapter 4 is reconfigured in the 21^{st} century with the advent of cell phones. Needless to say, there is a substantial difference between fixed and mobile phones: Cell phones are mobile, personal devices, and can be carried around in public spaces.

Lastly, the final chapter deals with pervasive games. Also as a conclusion of this book, I finally explicitly address hybrid spaces as multiuser environments. First, I define games as spaces to project the imagination, in an allusion to online multiuser environments, descendants of traditional role-playing games. Moreover, I compare games with the movements of the traveler and the tourist, as activities that take the subject out of physical space, projecting them into an unexplored, unknown, and unexpected place. Besides creating imaginary spaces, games can also be defined as virtual (potential) activities, in which the unexpected is always ready to emerge. Then I adress mobile games and mobile communities, in order to understand how the mobile interface can be used to create new types of games that include mobility, location-awareness, and ubiquity. The answer lies in pervasive games, which are games that are always on, and happen in between other activities. The case study of **Botfighters**, the location-based mobile game developed by Swedish company It's Alive, exemplifies this trend. Finally the chapter connects again art and (pervasive) games via the work of the British group Blast Theory.

This work connects history, theory, and empiricism in order to produce a snapshot of a dynamic time which will be regarded in the future as the beginning of the mobile era.

PART I: Multiuser Environments as (Virtual) Spaces

> "Cyberspace. A consensual hallucination experienced daily by billions of legitimate operators, in every nation, by children being taught mathematical concepts... A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding..." (Gibson, 2000, p. 67)

1. DEFINING CYBERSPACE = CYBERNETICS + SPACE

This chapter presents the concept of cyberspace as responsible for our understanding of the Internet as an immaterial information space. Cyberspace has been viewed as a space through which it was not only possible to access information, but also as a space to navigate and to inhabit. A brief history of the concept of space through art and science will help us to understand how spaces in which people formerly projected liberty and imagination have been displaced throughout the western history. Historically imaginary and liberty spaces have always been placed beyond physical (known) space, and so was cyberspace during the last 20 years. Another side of this story is told in chapter 3, based on traveler's tales about unknown wonders in unexplored spaces. In order to better appreciate why multiuser environments have been regarded as imaginary spaces, also in chapter 3, it is critical to first analyze the spatial construction of cyberspace, as well as the development of the concept of space itself. At first this chapter conceptualizes space via its articulation through thought and art. It presents how imaginary and liberty spaces have been represented by art and literature, emerging outside the borders of the known physical space. Afterwards, these liberty spaces have been projected on the Internet, mainly in multiuser environments.

In the 1950s, the cybernetics theory defined information as an immaterial entity, a fact that later influenced the perception of the *information space* as an immaterial and fluid space. Simultaneously, computers had been developed to simulate life processes, and therefore could be regarded as simulation machines that could mimic life, as well as space, without the physical support. In the next chapter, I will study how simulated worlds have been considered virtual worlds, practically merging in the same concept all characteristics related to the Internet: *immateriality*, *information*, *simulation*, and *virtuality*. Finally, this chapter studies interfaces of immateriality as digital "static" interfaces that contributed to construct our perception of the Internet as an immaterial and simulated space, which is detached from the physical environment. In order to enter the Internet, one was supposed to disconnect from the physical world. The case study of the installation **~~database~~**,[1] produced by the author and Fabian Winkler, calls our attention to the importance of material interfaces when interacting with digital technology. How could we ever have supposed that our perception of information was detached from the material supports which interpret and transmit it?

In the next chapters, I will show how the experience of space is changed by means of mobile interfaces, which displace our imaginary realms and contribute to a different constitution of the self. Likewise, I will show in chapter 3 how imaginary places changed according to the mapping of physical space, either by science or by traveling (movement through physical space). After all physical space had been geographically mapped, cyberspace turned out to be this imaginary space, since the information space (and consequently, the virtual space) was considered to be outside physical space, and frequently, outside the real. Now, with the rise of nomadic technology devices and the enfolding of digital and physical spaces, how do we represent our imaginary spaces?

The term cyberspace is not older than the Internet, although it was invented almost 10 years before the emergence of the World Wide Web (WWW) in 1992. Cyberspace, as coined by William Gibson in the novel **Neuromancer** in 1984, is a splice between two words: *cybernetics* and *space*.

[1] For further information about **~~database~~**, consult: http://users.design.ucla.edu/~silvaad/database. **~~database~~** is an award winning project, having received the first New Media Prize in the ACADIA (Association for Computer Aided Design in Architecture) Digital Design Exhibit in October 2002 (Pomona, CA), and being a nominated work in the category Interactive Digital Art, in the 6th Media Arts Festival in Tokyo, Japan (March 2003). In addition, the work has been exhibited in the Electronic Literature Symposium (UCLA, Apr. 2002), and presented in the File Symposium (Festival Internacional de Linguagem Eletrônica) (São Paulo, Brazil, August 2002) and ACADIA Congress. **~~database~~** has also being mentioned in **The Writing Machine**, N. Katherine's Hayles most recent book (2002) and in the newspaper Los Angeles Times (Apr. 2002).

1.1. Cyberspace as space

Space is not only given, but also constructed as a concept, being experienced in different ways. Throughout the history of western society, one has been able to inhabit many different types of spaces, culturally and technically constructed environments: physical spaces, imaginary spaces, represented spaces, and simulated spaces (cyberspace). We produce spaces, and the environment in which we live produces us as well.

Different perceptions and organizations of space correspond to specific periods of western history. From the Middle Ages until the 21st century, the way we organize spaces has determined social structures and technological development. Conversely, social and technological developments have also been responsible for the way space is represented through literature, art, and science fiction. Nowadays, we have access to formerly imagined spaces through their representations (text or images), indicating how these places have been envisioned in the past.

As the ultimate representation of utopian spaces, cyberspace has also been considered a simulated space. Following Jean Baudrillard's (1994, p. 6) logic of the simulacrum, cyberspace could be viewed as a hyperreality, that is, a space more realistic than its real counterpart. Simulacras are copies without originals. Cyberspace, in this sense, could be considered auto-referent, for it encompasses its own representation. Unlike traditional painting, the digital image is not based on classical representation models. According to Edmond Couchot, (1996, p. 39-40) the digital image no longer represents the world; it simulates it. The optical figurative logic in the Renaissance, also called morphogenesis by projection, required the presence of a real object, which existed prior to the image. Following this logic, each point in the canvas corresponded to a point in the physical world. Consequently, a link was created between the physical reality and its image, because the image was the representation of a specific reality. Couchot (*Ibid.,* p. 40) argues that representing means going from a point in a three-dimensional space to its corresponding point in a two-dimensional space.

In the digital domain, however, no point of whatever physical object corresponds to the pixel. The pixel is the visual expression, materialized on the screen, of a calculation made by the computer, which follows the programmer's instructions. If something exists prior to the pixel, it is the program, no longer the physical reality. That is why the digital image does not represent reality: It simulates it. Whereas traditional paintings and photographs represent a specific frame of reality, numeric images model the world, corresponding to a general idea of what the world is or could be. In this sense, while representation relates to an actual reality, simulation corresponds to a virtual reality.[2]

Like digital images, medieval techniques of representation were also not based on a classical figurative logic. Without linear perspective rules, objects in paintings were distributed in a flat space. The difference in size among objects was therefore related to a hierarchic structure, rather than to proximity or distance from the observer. Margareth Wertheim (1999, p. 85) suggests that

> these early artists did not paint in a flat iconic style out of ignorance, they had simply not been interested in portraying the concrete three-dimensional physical world; they were aiming for something quite different. Instead of representing the realm of nature and body, Gothic and Byzantine artists strived to evoke the Christian realm of the spirit.

Medieval art was mostly concerned with a symbolic representation of the world, i.e., an ideal world. Soul space was a reality for the medieval man, often more authentic than the physical world itself. At least, it was worthier of being represented. In the medieval world, Heaven, Purgatory and Hell, so well described in Dante's **Divine Comedy** (Aliguieri, 1994), represented the projection of imaginary space at that time. These spaces were placed beyond physical space, although they have been described according to realistic physical characteristics. Hell was divided into concentric circles, descendant toward the center of the Earth. Purgatory, in turn, was represented as a mountain somewhere in the southern hemisphere, also composed of concentric circles ascending toward Heaven. We should remember that for the medieval man the southern hemisphere was as obscure and unknown as the center of the Earth. Hell and Purgatory, according to medieval paintings, were highly hierarchic spaces, where each circle corresponded to a specific sin. In this sense, lighter sins would place the subject closer to God, while serious sins placed them nearer to the devil.

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[2] See chapter 2, **Defining virtual**, related to Deleuze's concept of virtual in **Difference and Repetition** (1994).

Unlike Purgatory and Hell, Dante's description of Heaven contained fewer physical details. "Of all regions of after life, Heaven is the only one Dante had trouble describing. Whereas the *Inferno* and the *Purgatorio* each present a well-defined landscape and imagery, the *Paradiso* is famous for being so nebulous," comments Wertheim (*op. cit.,* p. 64). Dante "constructed" the Paradise based on the Ptolomaic's geocentric system current at that time. According to Ptolemy, the Earth was static and the nine existing planets (nine heavens in Dante's poem) turning around it. These "planets" were the moon, Mercury, Venus, the sun, Mars, Jupiter, Saturn, the fixed stars, and lastly, the angels. In the Christian imaginary, Heaven is the highest spiritual place, in which souls can be saved and live close to God. Equally, in Dante's cosmology, both the soul and the body were redeemed in Heaven's unlimited space, a place which was outside the physical known space, and which represented eternal salvation (individual liberty).

The goal of Catholic religion has always been the soul's salvation, and its subsequent arrival in Heaven. For the medieval imaginary, the representation of this spiritual space was *not* visually disconnected from physical space. In medieval painting, Heaven was also part of the map and, consequently, of the world.


Pictures 1 and 2: Two medieval pictures. The first one shows no proportion rate between men and buildings. The second shows Heaven as part of the map.

The Aristotelian concept of space was also responsible for guiding the world's representation since ancient times, substantially influencing medieval representation techniques. Aristotle regarded space as the body's involucrum. Therefore, importance was given to the perimeter of an object, rather than to its volume. In this context, a smaller but wrinked object would occupy more space than a bigger, but smooth object, because the former one would have a larger area. This idea emphasized individual bodies instead of the space as a whole. In addition, if there were no space without bodies, there was also no empty space. Actually, Aristotle had no concept for space, just a concept for place. The philosopher conceived "space" as an assemblage of places, which corresponded to objects. In this sense, place for him was the tendency of beings to occupy a region according to their nature. Immobility was the key for this "naturalism": the natural place of a body was where it would rest. If displaced from its natural position by an external agent (movement was always understood as a non-natural phenomena), the body would try to return spontaneously, as soon as the external interference ceased. Therefore, we can conclude that "place" was considered a property of bodies, and not of space. Moreover, place was also a quality of the shape of objects. For Aristotle, the concept of place had no exteriority, that is, space, as well as movement, had no autonomy in relation to physical bodies. In addition, the Aristotelian description of movement, as well as his concept of "space," were primarily qualitative, i.e., once one knew the shape of beings, their movement could also be identified. According to this logic, heavy bodies would tend to go down to the Earth's surface, while light bodies like fire would fly to the lunar sphere. The Aristotelian world was closed, finite, and static. Moreover, only material objects had deepness, but not the space as a whole. If the space of each object corresponded to its surface, then there was no integrated space, which would fill the space *in between* bodies.

The Aristotelian world's view had profound consequences in the way painters represented the world during the Middle Ages. In the early Renaissance, for example, they were capable of representing isolated objects according to perspective rules, but not the space in between them. Consequently, the same painting could have objects represented from different points of view, as if they did not belong to the same environment.

Space was integrated after linear perspective in the 15th century. Across the canvas, objects as well as the space in between them were represented threedimensionally from a unique standpoint. The observer's view should be as close as possible to the real. Simultaneously, the representational space moved from celestial symbolic space to terrestrial physical space, and the study of man and nature acquired importance. The terrestrial space was still organized by God, but now also dependent on human construction. The strongest consequence of this displacement of the hierarchic space was the introduction of linear perspective in the representational artistic space. With the aid of perspective rules, artists started to paint the physical world as it appeared to the human eye. Therefore, the artistic aim was no longer to represent an ideal spiritual world, but a world of perfect geometric forms. Although linear perspective characterized a larger control over the represented space, it closed space as well. The classical logic of representation, according to Couchot *(op. cit.,* p. 41), arises from a perspectivist model, which is capable of simultaneously reproducing the world and also producing a particular view of the world, in its broadest sense. Represented through a unique point of view, the Renaissance artistic space was also delimited, restricting the places where the imaginary could be represented.

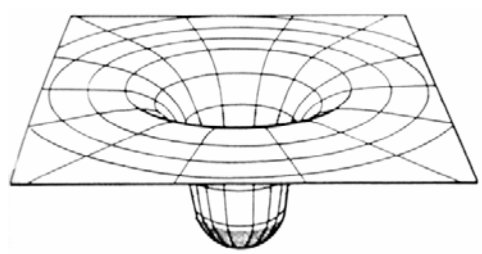
The (re)introduction of perspective in the arts also had great impact on the physical sciences, for it allowed the geometrization of the sub-lunar world. Galileo's posterior work would have been impossible without the pioneer exploration of space developed by Giotto, Raphael, and Leonardo. The homogenization of the Renaissance space corresponded to the representation of one part of the real: physical space. Nevertheless, the Renaissance man was dualistic and believed in two distinct realities: the Heaven and the Earth. Moreover, people at that time had great trouble applying to Heaven the same rules valid on Earth, because Heaven was still a symbolic space, not subjugated by terrestrial laws. Later, Kepler, following Galileo's conceptions, geometrized celestial space. He neglected the Ptolemaic geocentric system, creating a new model centered on the Sun. The Earth was no longer the center of the universe, but became part of it. As a result, terrestrial and celestial spaces have been integrated and subjected to the same physical law, constituting a homogeneous physical space.

Celestial and terrestrial spatial unification formed the basis of a Newtonian concept of space. From the 16th until the 20th century space had been considered static, immutable, and infinite. Newtonian space resembles an empty, three-dimensional closed box. Metaphorically Newtonian space has often been compared to a theatrical stage, in which physical bodies would play the role of characters (the space inhabitants), and the space would be the stage. According to this model, space and matter have completely different natures, and the characters' actions do not affect space. The space has equally no action over characters. Moreover, along with this Newtonian model, time plays the role of a separate element, very similar to a straight line made out of an infinite sequence of presents. Consequently, past is formed by old presents, and future is composed of forthcoming presents. According to Newton, time is linear, unique, and independent from space and matter.

While the Aristotelian world was constituted of individual bodies and their forms, the Newtonian world was composed of space, matter, and time, and physical forces were responsible for connecting these three elements. Catholic dogmas were still strongly present in modern society, although the representation of Heaven as a redemptive space had been completely disconnected from the physical sky, which was from this time on ruled by physics.

This perception of the world changed only in the beginning of the last century. At this time, Hubble, by means of a telescope, found out that the universe is constantly moving. Therefore, if galaxies were going farther away from us, he concluded that the universe should be expanding. For physical sciences that meant that time and space were no longer perpetual, but were rather born at some point in the past. From this understanding, there must have been a time when there was no time and space at all. In this context, if space was regarded as a dynamic structure, it could also be redefined in function of time.

Simultaneously, Albert Einstein's discoveries were critical to transforming the concept of space. With the General Relativity Theory, Einstein found out that space and time are relative, and that space had a shape: it was curved. In a simplified way, Newtonian space can be regarded as an empty and closed box, while space according to Einstein resembles a vast membrane. In order to explain the space curvature, Margareth Wertheim (*op. cit.,* p. 173) compares Einsteinian space to a rubber sheet stretched out like a vast trampoline. Imagine yourself throwing a bowling ball toward the center of the sheet. The rubber sheet deforms due to the depression caused by the ball. According to the General Theory of Relativity, that is what a solid body, like the Sun, causes to the space "membrane." It distorts space-time around itself. Physicians refer to this distortion as "curvature."



Picture 3: Space-time deformed by matter.

When gravity is considered a product of this space curvature[3], the space-time also acquires physicality and it is no longer an empty and neutral box. As argued by Albert Einstein (1999, p. 128), "according to the General Theory of Relativity, space has no independent existence in relation to what fills it." Therefore, he attributes physicality to "empty" space. He also attributes the idea of reality to something which is not "directly sensed." It is as if matter and space-time form a homogeneous structure, and mutually affect one another. Metaphorically, relativistic behavior would be like the ocean surface (although in three dimensions), in which waves propagate.

Again by means of the theater metaphor, we could suggest that the stage has become elastic and changes depending on the characters' actions. Therefore, the stage becomes also a character and both influence each other mutually. Being undissociable from space, matter has also the power to deform it. With the formula $E=mc^2$, matter and movement are related. Bodies can now convert into movement and movement translates into matter. In addition, time becomes one more dimension of the real and is no longer disconnected from space and matter.

An overall view of the evolution of the concept of space suggests that it changed from a spiritual conception, influenced by religious dogmas and created by God, to a

[3] Gravity is exemplified by Wertheim (1999, p. 172) in a similar way. When throwing a billiard ball along the borders of the deformed space-time, it will tend to circle around the depression, until it falls into the hole. Therefore, it is the space-time deformation that generates gravity, and no longer a force, which formerly existed between two solid bodies.

humanistic idea, developed by science. As the official voice has moved from religion to science, physical space, now defined by this science, becomes the "totality of the real." Curiously, at the end of the 19th century and in the beginning of the 20th the first theories about hyperspace emerged. When the imaginary could no longer be projected into the three dimensions of physical space, people started to wonder about the existence of other dimensions, which would not be restricted to the known world.

After Einstein developed the theory about the fourth-dimension, there has been the development of theories about the fifth, sixth, seventh… and up to the eleventh dimensions of space. Space has folded into minuscule parts. Art and science fiction followed these discoveries with the hope of representing a new type of space: one that would not be limited to known physical space, which would not be bounded into three dimensions, and which, similarly to Dante's celestial space, would be located beyond our sight. This idea has been exemplified by Margareth Wertheim with Edwin Abbot's tale **Flatland: a romance of many dimensions** (*op. cit.*, p. 192). The 1884 novel tells the story of a land inhabited by two-dimensional geometric figures: triangles, squares, and pentagons. The greater the number of their sides, the higher their social position. Consequently, circles were the prophets of the **Flatland**. The figures used to live in a plane world and the idea of another dimension was regarded almost as a heresy. Once, however, a strange inhabitant of the "land of the three dimensions" visited a Square. This strange figure was a Sphere, one of those land's prophets. The Sphere, thus, takes the Square into the three-dimensional world, and he marvels at what he sees: three-dimensional versions of all geometric flat forms. Particularly interesting was the cube, a three-dimensional version of himself. The Square then began wondering about other dimensions of space; not only three, but four, five, six… Nevertheless, when inquired about the fourth dimension of space, the Sphere became visibly irritated, and sent the Square back to the **Flatland**. After all, the idea of a fourth dimension was inconceivable in a three-dimensional world!

Herbert George Wells (Wells *apud* Wertheim, *op. cit.,* p. 193), considered by many the father of modern science fiction, explained what would be the fourth dimension of space: "Just as a two-dimensional napkin can be folded within three-dimensional space by bringing together two distant corners, so too within a four-dimensional space two parts of three-dimensional space can be ‘folded’ together.” Therefore, every time there is a fold in space, another dimension would be created. Because it was difficult to understand, at the end of the 19th century many authors considered a fourth dimension of space as a place of liberty and redemption.

When physical space acquired the fourth dimension, artistic representational space lost one. With modern art, artists started to abstract forms, and gradually set the image free from classical representation patterns.[4] According to Aristotle, to abstract means to detach reality from its particular features in order to achieve the pure concept which has no peculiarities, that is, the universal. With Modernism, painters strived to represent the universal, and several times they named the universal as concrete: the color is concrete, and the pure shape is concrete. According to Couchot (1996, p. 44), the aim of modern art was no longer to *represent* reality, but to *present* it. Modern art referred to a reality that was intrinsic to art itself and not to an external physical space. Malevich (Malevitch *apud* Wertheim, *op. cit.*, p. 198), creator of the Suprematism movement, whenever asked about the meaning of his **Black Square on White** used to answer that it was “a desperate attempt to set art free from materiality.” Similarly, Mondrian, in abstracting his shapes, tried to represent an absolute reality, which was universal, and which was not constrained to the details of the physical world. Mondrian used to paint a flat world, whereas Picasso and Braque created multidimensional forms. All of them, however, were trying to represent reality beyond visible three-dimensional space. According to them, if the traditional three dimensions of space were no longer enough to explain the space in which we live, then all perspective rules are equally not valid. Consequently, art could be liberated from the classical representation of the physical world, since the perspective technique could no longer represent the real.

At this point we can perceive an elevation of the *concept of space*. With Aristotle, space was merely a subcategory of reality. Moreover, there was no concept of *space* itself, but rather the idea of *place*. Later on, the dualistic medieval space was geometrized, and the terrestrial physical space incorporated the celestial symbolic space, creating an integrated and unique physical reality. With the rise of Newtonian physics in

[4] Classical representation can be understood as when for each point in the canvas there is a corresponding point in reality. Therefore, a one-to-one representation happens (Cf. Couchot, 1996).

the 17th century, the concept of space acquired more significance, once it was one of the three categories of reality, along with matter and forces. Finally, in the 20th century, the visible physical space was connected to the invisible space of tiny particles, or the nanospace. Atomic physics and nanotechnology emerged as sciences, and the world observed the creation of a folded space that encompassed both the macro- and the microcosms.[5]

According to Margareth Wertheim (1999, p. 206), it was a Polish mathematician, Theodr Kaluza, who first proposed the idea of a fifth dimension of space, which explained the minuscule electromagnetic force. Kaluza believed that electromagnetism, just like gravity, was produced by curves (or folds) in a multidimensional space. Unlike the macro folds produced by gravity, electromagnetism was a microscopic fold. Kaluza's theory has not been completely proved, although it raised an interesting question: How many dimensions (or folds) of space are there?

Around 1980, two new forces were discovered: weak nuclear force and strong nuclear force. Nowadays scientists believe that these two forces, together with gravity and electromagnetism, constitute our universe. While Kaluza explained electromagnetism added one more dimension to Einstein's four, scientists found out that they would need to add six more dimensions in order to explain weak and strong nuclear forces. As a result, they created a space with 11 dimensions: four large ones (three of space and one of spacetime), and seven microscopic space dimensions. Still according to Wertheim (*Ibid.,* p. 211), "perhaps the most radical feature of this eleven-dimensional vision is the fact that it explains not only all forces, but *matter* as well as a byproduct of the geometric of space." Consequently, in the 20th century space has become the only category of the scientific world. Matter and force were, therefore, byproducts of space. This theory received a general name of TOE, or *Theory of Everything*. The TOE tries to apply the same physical laws for the very big, as well as for the really small, raising the awareness that everything that exists belongs to the same integrated space. Wertheim (*Ibid.,* p. 217-222) argues that the inclusion of everything that exists inside the category of physical

[5] More on nanotechnology creating a folded space can be read in chapter 7, in the case study about the exhibition **Nano**.

space abolishes our spaces of liberty and imagination. Therefore, she points to cyberspace as the new place for projection of imaginary spaces.

Augmenting functionalistic dreams that strived to go beyond the three dimensions of material space, cyberspace has been considered a space deprived of matter. In addition, extending Couchot's (1996, p. 46) point of view, the information space did not require the physical reality to produce an image, creating an auto-referent space. Similar to nonrepresentative art, it could also have no analogy to the physical world.

1.2. Cybernetics and the oddness of immateriality

William Gibson (2000, p. 67) defined cyberspace as a "consensual hallucination" accessed when the user "jacked into" a computer. According to him, cyberspace was an immaterial data space, which one could inhabit when set free from the weight of the physical body. By means of neural implants, it was possible to disconnect from the physical body and to "enter" an information world. Case, the novel's main character, regarded his body as so much meat that the only place in which he could feel free was in the immaterial cyberspace. In this sense, cyberspace had two basic characteristics: (1) It was an immaterial world; and (2) it was a simulated space.

The first characteristic is related to the origins of the concept of cybernetics as defined during the Macy Conferences in the 1950s, whereas the second has its basis in the inception of computers as simulation machines around 50 years Aug. Gibson, therefore, used two concepts linked to the theory of information and communication in order to create an immaterial space.

The term cybernetics, derived from the Greek word for steersman *(κυβερνητική),* was coined by Norbert Wiener during the Macy Conferences. Following the cybernetics theory, the steersman and the boat (man and machine) are interdependent entities. Both form a unique system, which cannot function without any of its parts. On the one hand, the steersman would not be a steersman without the boat to drive; on the other hand, the boat needs to be driven. The ultimate modern cybernetics machine has been considered the automobile, viewed as a perfect synchronization between man and machine.

Cybernetics, according to the **Web Dictionary of Cybernetics and Systems**[6] (Heylighen, 1993), is the science of communication and control in animal and machine. The theory was formulated from 1943 to 1954, during the annual meetings of the Macy Conferences on Cybernetics, sponsored by the Josiah Macy Foundation. Norbert Wiener, John von Neumann, Claude Shannon, and Warren McCulloch, among others, participated in the events.

One of the main concerns of cybernetics was studying the organization of systems. Organization accounts for how the components of a system interact with one another, and how this interaction determines and changes its structure. It explains the difference between parts and wholes and, what is more important, it is described without reference to their material forms. The disinterest of cybernetics in material implications separates it from all other sciences that designate their empirical domain by subject matters such as physics, biology, sociology, engineering, and general systems theory.

As a result, the Macy Conferences were critical to the definition of information as a disembodied medium, resulting in the triumph of information over materiality. Information then became a theoretical entity, which contributed to the construction of human (neural) structures as flows of information. With cybernetics, the concept of human has also been redefined. Humans were to be seen primarily as information-processing entities essentially similar to intelligent machines. Ultimately, what would be the difference between a man and a machine, if both could be viewed as information processors? Claude Shannon (*Apud* Hayles, 1999, p. 52) first defined information as "a probability function with no dimensions, no materiality, and no necessary connection with meaning."

Following this point of view, Norbert Wiener *(Id.)* thought of information as representing a choice. More specifically, he considered it a choice among a set of possible messages. According to Shannon (*Ibid.,* p. 32) the amount of information received connected to the level of unpredictability in a message: the more unexpected (random) a message, the more information it conveys. Conversely, completely expected messages do not convey any information. For example, if it is a sunny day and I come

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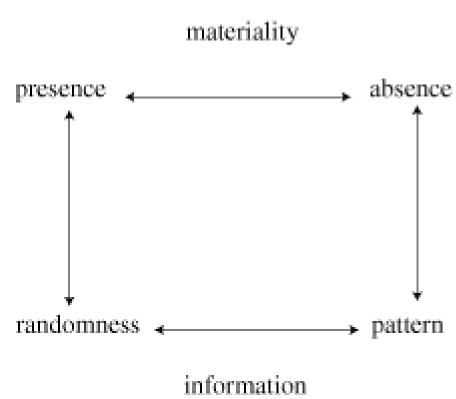
[6] HEYLIGHEN, Francis. **Web dictionary of cybernetics and systems.** Created on: 8 Jul. 1993. Last actualization on: 31 Oct. 2002. Available at http://pespmc1.vub.ac.be/ASC/indexASC.html. Accessed on: 31 May. 2003.

and say, “We are going to have sun today,” that does not represent any specific new information. However, if the sun is shining and I tell you that it is going to rain in a few hours, this last statement carries a much greater amount of information. So the information increases as the probability that the event will occur diminishes. Although information is often defined as *reducing* uncertainty, it also *depends on* uncertainty. However, in order to understand a message some part of it must already be known, for example, the distinction between a sunny day and a rainy day. Consequently, the ideal information should be an average between pattern and randomness.

N. Katherine Hayles defines the semiotic square that relates materiality to information as a function between presence and absence (for materiality), and pattern and randomness (for information). While the existence of material forms is based on an interplay between presence and absence, information works according to pattern and randomness. In this sense, material forms can be either present or absent. On the other hand, “pattern is like presence in that the recognition of pattern is often associated with the perception of presence. (…) But unlike presence, pattern need not imply the material existence of an object” (Hayles, *op. cit.,* p. 7-8). A matrix, for example, is a pattern. Following this perspective, randomness signifies the negative of pattern. Therefore, in order to address the immateriality of cyberspace, the terms pattern and randomness would be more adequate than presence and absence.



Picture 4: The (simplified) semiotic square
according to N. Katherine Hayles (1996, p. 9).

In this sense, randomness is related to entropy and chaos, while pattern connects to information and organization. The idea of the cybernetic machine constructed human beings as patterns of organization, and bodies as patterns of information. Moreover, "existing in the nonmaterial space of computer simulations, cyberspace defines a regime of representation within which pattern is the essential reality, presence an optical illusion" (Hayles, *op. cit.,* p. 36).

Information as defined by Shannon (*Apud* Hayles, *op. cit.*, p. 52) had no connection with context whatsoever. Based on this idea, Wiener *(Id.)* supported that all information could be transmitted via a binary code, no matter its content. Hayles (*Ibid.*, p. 52) exemplifies Wiener's idea:

> Suppose there are thirty-two horses in a race, and we want to bet on Number 3. The bookie suspects the police have tapped his telephone, so he has arranged for his clients to use a code. (…) When we call up, his voice program asks if the number falls in the range of 1 to 16. If it does, we punch the number "1"; if not, the number "0." We use this same code when the voice program asks if the number falls in the range of 1 to 8, then the range of 1 to 4, and next the range of 1 to 2. Now the program knows that the number must be either 3 or 4, so it says, 'if 3, press 1; if 4, press 0,' and a final tap communicates the number. Using these binary divisions, we need five responses to communicate our choice.

Following this point of view, information is considered as a bodiless fluid and an immaterial entity that is able to flow from medium to medium without changing its essence. In information theoretical terms, no message is ever sent. What is sent is a signal. Only when the message is encoded in a signal for transmission through a medium does it then assume material form. Abstracting information from a material base meant that information could become free-floating, unaffected by changes in context. Consequently it was regarded as completely disconnected from the material interfaces where it is (necessarily) inscribed, or independent from the physical space over which it flows.

Hayles (1999, p. 16) defines three main phases in cybernetics history, related to the organization of systems as information structures. The first one, Homeostasis, goes from 1945 to 1960. It is based on feedback loop structures and circular causality. Some physical artifacts related to this phase are Claude Shannon's electronic rat, and Ross Ashby's homeostat. The homeostat is a physical structure that receives input from the environment in order to maintain external stability. The most basic example of a homeostat is a heater with an internal thermometer that would say, “if the external temperature is higher than the set temperature, turn off; otherwise, turn on.” As a result, the heater maintains a circular relation to its environment. A special feature of cybernetics is that it explains such processes in terms of the organization of systems, i.e., the circular causality of feedback loops is taken into account for processes of regulation and to a system’s effort to maintain equilibrium or to reach a goal. In a homeostatic system, human and machine are alike, since both need stable interior environments. Both man and machine are viewed as information processors and tend toward homeostasis when they are functioning correctly. The idea behind cybernetics was not so much to think about machines as people, but to check if a man could function as a machine. In this context, it looked for discovering what connected humans, animals, and machines as information-processing devices.

The other two waves of cybernetics, autopoiesis and virtualities, occurred respectively from 1960 to 1985, and from 1985 to the present. While the second phase was related to the discussion about self-organization and the incorporation of the subject into the system, the third is directly linked to artificial life, mutation, and simulation systems. In this sense, all three cybernetic waves are strictly connected to the future development of the concept of cyberspace. The first wave defined information as an immaterial entity. The second wave questioned whether what we view in the world corresponds to external reality or is just an internal construction of the world. This phase is also related to the Cartesian doubt, which is going to be addressed in the next chapter, that questions whether reality is indeed real or just a product of our imagination. Finally, the third phase is related to the construction of computers as simulation machines.

1.3. A simulated world of information

In contrast to Humberto Maturana and Francisco Varela’s autopoietic circular structure current in the second cybernetics wave, the form that best exemplifies artificial life systems is a spiral, based on evolution. Maturana and Varela (Hayles, *op., cit.,* p. 222) enlarged the definition of living systems to include artificial life systems. Artificial life's research can be split mainly in two fields. The first one does not consider embodiment as an important feature, and studies virtual reality simulations. The second field, for which embodiment is indeed important, connects to the development of robotic structures and artificial intelligence. Virtual reality simulations are therefore important components of the definition of digital space as immaterial environments, where disembodied life forms can proliferate. The assumption that the code of life (i.e., information) could be separated from matter guided most studies about the creation of digital life. Christopher Langton (Langton *apud* Hayles, *op. cit.,* p. 231), one of the most visible A.L. researchers, suggested in 1989 that "the principle [*sic*] assumption made in Artificial Life is that the 'logical form' of an organism can be separated from its material basis of construction, and that 'aliveness' will be found to be a property of the former, not the latter." Additionally, when Langton affirms that artificial life locates *life-as-we-know-it* within the larger picture of *life-as-it-could-be,* he expands the principle of virtual systems to life systems. Artificial life plays an important role in the construction of computers as simulation machines.

In the 1970s, John Conway invented the **Game of Life**, based on John von Neumann's study of cellular automata (CAs). In the 1940s, von Neumann envisaged a systematic theory which would be mathematical and logical in form, and which would contribute in an essential way to our understanding of natural systems (natural automata) as well as to our understanding of both analog and digital computers (artificial automata). Neumann wanted to study reproduction abstractly, but the word "cellular" was not meant biologically when used in this context. It referred, rather, to adjacent spaces that formed a pattern. CAs were not invented, therefore, to be realistic models of nature, but to represent information reproduction.

In order to simulate a cellular automata behavior one needs to establish an initial set of rules, which are invariant over time, and place a determined number of cells in an n-dimensional grid. Once the initial state of the system is established, its evolution is unpredictable, because each cell acts just depending on the state of the closest neighbor, which changes over time. The simulation can, therefore, end up either in a state of stasis or continue forming different patterns, depending on the position of the initial cells and the set of rules formerly determined. Von Neumann's cellular automaton had a total of 29 states and over 200,000 cells. While his work has never been simulated (due to its enormous complexity), it proved the viability of artificial reproduction and launched the study of cellular automata.

Three decades later, Conway simplified von Neumann's ideas creating a pattern where cells could be either alive or dead (on or off), and that had a very simple set of rules for determining what the next state of the system would be. The game is played on a two-dimensional grid. Each cell has eight neighbors, adjacent across the sides and corners of the square. Whereas von Neumann's cellular automaton was developed on paper, Conway projected a model that could support universal computation. In the **Game of Life,** if a cell has less than two neighbors, it dies (loneliness); if it has more than three neighbors, it also dies (overcrowding); if an empty cell has three live neighbors, then it comes to life (reproduction); otherwise (exactly two live neighbors), it stays as it is (stasis). According to William Flake (2000, p. 246), "this set of rules contain the most basic properties of how real-world creatures interact with the basic constraints on population density and the conditions for 'reproduction.'"

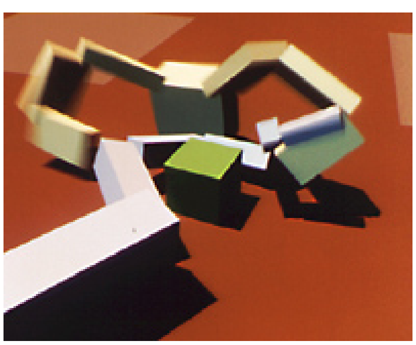
Edward Fredkin (1989, p. 24) in a study about cellular automata observed that at the most fundamental level the automaton would describe the physical world with perfect precision, "because (…) the universe *is* a cellular automaton, in three dimensions." In this sense, Fredkin viewed the world as pure information. He suggested that the most elementary particles of our world, such as atoms and electrons, could be considered nothing more than moving patterns of information. In contrast to Margareth Wertheim (1999, p. 217), who suggested that everything is included in physical space and that to cyberspace has been left the information space, Fredkin (1989, p. 26) believed that the world in which we live is already composed of information, and therefore could be simulated as cellular automata. He ended his article with a question of circular causality.

> The problem begins with the fact that information typically has a physical basis. Writing consists of ink, speech is composed of sound waves; even the computer's ephemeral bits and bytes are grounded in configurations of electrons. If the electrons are in turn made of information, then what is the information made of?

And then, wrapping up in opposition to Shannon's concept, "I've come to the conclusion that the most concrete thing in the world is information" (*Ibid.,* p. 27).

Computers have been used to simulate life, and they may also create whole new forms of life. A frequent question among artists and professionals who build virtual worlds has been whether virtual spaces and creatures should simulate their physical correspondents or have no reference at all in reality. Why should we simply reproduce physical creatures and spaces in the digital space of computers, if there is the possibility to experiment with whole new types of spaces and life forms? Due to the fact that cyberspace was regarded as a dataspace, and information was considered immaterial, digital life and spaces could in theory assume any form.

Karl Sims's **Evolved Virtual Creatures** (1994) is a computer simulation that deals with the Darwinian evolution of virtual block creatures. Virtual agents living in a 3D virtual environment are programmed to evolve on their own through competition with other beings. Each one has different skills, such as swimming, flying, or crawling. Those who survive can reproduce their virtual gene, originating new and better adapted creatures.[7] Sims has also created simulations with evolving virtual plants. In **Panspermia** (1990), artificial evolution techniques were used to select from random mutations of plant shapes until a variety of interesting structures emerges. Both in the **Game of Life** and in Sims's simulations, creatures evolve based on their relationship to the simulated environment in which they live, excluding any relationship to the external environment. Simulations simplify complex behaviors, trying to model real world features in digital space.



Pictures 5 and 6: Karl Sims: **Evolved Virtual Creatures** and **Panspermia**

[7] This piece was shown in 2002/2003 at the ZKM (Zentrum fuer Media und Technologie) in Karlsruhe, Germany, in the exhibition **Future Cinema**.

Besides simulating life from its inception, the function of a computer has been to simulate the environment in which we live. According to William Flake (2000, p. 5), "one of the first uses of computers was to simulate the evolution of complicated equations." Later, computers were used to represent weather simulations, economic models, and cognitive models of the brain, as in cybernetics and neural networks. In the edition of January 23, 1950, of **Time** magazine, Norbert Wiener pointed out that computers already had an extraordinary resemblance to the human brain, both in structure and in function. In the same article, some scientists also agreed that computers could simulate the human brain because it thinks by judging present information in the light of past experiences, and that is roughly what machines do. In contrast, Professor Aiken *(Id.),* head of Harvard's Computation Laboratory in the 1950s suggested that "the machines show in rudimentary form at least all the attributes of human thinking except for one: imagination." Interestingly, a couple of decades later the computational space was regarded as the perfect space in which humans could project their imagination.

Computers were born as simulation machines even before the invention of the graphic user interface (GUI), which intended to simulate on the screen the physical space of the desktop. The GUI is intended to simulate our physical desktop and, thus, create a closer relationship between computers and humans.

However, Janet Murray (1997, p. 80) affirmed that computers started to be viewed as space when it was first possible to interact with them. To this extent, the graphic interface was not responsible for the digital environment's spatiality; it only emphasized it. For instance **Zork**, a computer game created in the 1970s at the Massachusetts Institute of Technology (MIT), was the first digital role-playing game (RPG) with a mere textual interface. The possibility of giving commands to the computer and receiving feedback from the machine created a whole new space on the other side of the screen. Due to the interactivity, the user could feel that s/he "belonged" to that other domain. Hence, spatial feeling depend on interactivity, not on graphics. With a textual interface, **Zork** simulated a fantasy world, following the models of traditional RPG games (*Ibid.,* p. 74-79). While **Zork** simulated an imaginary world, the GUI simulated the physical space.

Murray (*Ibid.,* p. 83) also defines cyberspace as a narrative space. According to Hayles (1999, p. 38),

> Cyberspace is created by transforming a data matrix into a landscape in which narratives can happen. In mathematics, “matrix” is a technical term denoting data that have been arranged into an n-dimensional array. (...) Because the array is already conceptualized in spatial terms, however, it is a small step to imagining the matrix as a three-dimensional landscape.

Gibson defined cyberspace following the cybernetic concept, which considered information as an entity with no connection to materiality. However, the Internet with which cyberspace has become synonymous, is based on material interfaces that allow us to communicate with the virtual world. Such interfaces define what the digital world can be.

1.4. Interfaces of immateriality

Margareth Morse (1996, p. 201) defined cyberspace along three main axes: one was the axis that explored the mixture of virtuality and materiality, emphasizing the “augmented reality of distributed cyberspace in which some of us already live.” The second was related to textual MUDs and MOOs where one could experience movements in and between worlds. Finally, the third axis of cyberspace was linked to graphic interfaces that constructed virtual worlds. For her, this was the most traditional type of virtual world, in which cyberspace was solely immaterial and within which one could assume different personas. While the third type was connected to immersive virtual environments, the second type was linked to the creation of virtual communities via multiuser environments, and the first one to mixed realities. Interestingly, the only axis that considered the cyberspace materiality was the first one, in which the connection to physical space was clear. Generally mixed reality systems (including augmented virtuality and augmented reality) are defined when superimposing graphic or sound information to the physical environment, or adding information from the physical world to a modeled world (Ohta; Tamura, 1999, p. 6). However, the presence in a virtual world (and here I mention virtual presence, that could be defined as a pattern) is extremely dependent on the types of interfaces used to connect to it, a head-mounted display (HMD) or a mouse.

Decisive for the construction of digital space as immaterial were specific interfaces used to connect to it: for example, the computer screen and cables connected to the telephonic network. The use of these types of interfaces had two main consequences. First, in order to connect to the Internet it was necessary to disconnect from the physical world. It was necessary to stay *immobile* in the physical domain in order to *enter* the digital world. Science fiction narratives like **Neuromancer** (1984), which contributed to the conceptualization of digital space, presented the connection to cyberspace through neural implants, which also required the user's immobility. Second, the screen as an interface represented a "barrier" in the relationship between digital and physical spaces. The need for avatars when inhabiting digital spaces was a consequence of this fact. Since one could not be physically in cyberspace, there was the necessity of representing the subject in the digital domain. As a result, body issues have always been critical for the development of multiuser environments. How do you represent the physical body in digital spaces?[8] Once in cyberspace, one was supposedly disconnected from the physical body and therefore able to "create" as many bodies as one desired. Based on this belief, the study of "multiple online identities" has become a central point during the last decade (*Cf.* Turkle, 1995). Since the presence in cyberspace was considered independent of physical (material) space, the virtual, regarded as synonymous with cyberspace, began to be also viewed as immaterial. In addition, since physical was generally considered the domain of the real, cyberspace became a place for the imagination, that is, for the practice of the unreal. The possibility of creating virtual reality environments in which the user could feel immersed, but could not actually touch, contributed to the immateriality of cyberspace.

However, how can a space created by means of physical interfaces be considered immaterial? The connection to the Internet has always been made through the use of a keyboard, a mouse and a screen: material interfaces. The Internet itself is a network of physical computers, working as servers and routers, connected by wires and waves. Moreover, the majority of VR immersive environments use the head mounted display (HMD) as a physical interface.

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[8] Issues about the virtual body will be considered in chapter 3, in the section 3.3.1. **MUDs and bodies**.

William Gibson's (*op. cit.,* p. 67), description of cyberspace as a "consensual hallucination" emphasized virtual space as a place that existed inside the mind, as well as an information space. And information has historically been regarded as an immaterial entity, disconnected from any materiality. However, according to N. Katherine Hayles (1999, p. 13), "for information to exist, it must always be instantiated in a medium." Therefore, it is not possible to disconnect information from the physical artifacts that embody it and make it real. For example, a book would never be a book without its physical interface. The information that it contains must be physically somewhere. Human beings would never be humans *if* it were possible to detach our minds from our "support" bodies. Similarly, cyberspace would never be possible without physical computers and networks.

For users who may not know the material processes involved, the impression is that information is predominant over materiality, since it is frequently thought that information can manifest itself on several different material supports and still be the same. However, information can never be detached from the material supports (or interfaces) that carry it. Hence, it is not possible to disconnect matter and information. There could never be an information space without the physical interfaces that help to actualize it.

In her most recent book, **Writing Machines**, N. Katherine Hayles (2002) stresses the importance of material interfaces to defining the meaning of the message. In the domain of electronic literature, she coins the term *technotexts* to describe literary works that interrogate the interfaces in which there are inscribed, mobilizing reflexive loops between their imaginative worlds and the material apparatus embodying that creation as a physical presence (Hayles, 2002, p. 25). Inscription technologies can be regarded as interfaces, or any device that instantiates material changes that can be read as marks. *Technotexts* are another type of electronic texts, different from hypertexts and *cybertexts*. Hypertexts can be defined as having at least three characteristics: multiple reading paths, chunked text, and some kind of linking mechanism to connect the chunks. *Cybertexts*, as defined by Espen Aarseth (1997, p. 1), are broader developments of hypertexts. They emerged when new types of programming languages, as well as new graphic possibilities became part of the World Wide Web and allowed the appearance of a wide variety of texts that used combinatory structures. The concept of cybertext includes print works such as Raymond Queneau's **Cent Mille Milliards,** electronic fictions like **Afternoon, a story,** computer games, and even the **I Ching**. Consequently, while hypertext connotes an emphasis on links, *cybertexts* emphasize a computational perspective. Conversely, *technotexts* pay particular attention to interactions between the materiality of inscription technologies and the inscriptions they produce, reminding us that no medium can be regarded as completely immaterial when dependant on the material interfaces that produce it.

As cybertexts are a broader aspect of hypertexts, *technotexts* are a broader part of *cybertexts*. They include not only texts, but also media artworks that deal with electronic technology. An example of an artwork that questions the material interfaces in which it is inscribed, and therefore calls the user's attention to the importance of interfaces in the definition of the medium, is **~~database~~**, an electronic reading device created by the author and artist Fabian Winkler.

1.5. ~~database—~~the role of material interfaces

~~database~~ interrogates the technology upon which it is inscribed and, by revealing or making us aware of its implications, allows us to see what exactly we are doing when using it. The installation plays with the idea that the materiality of technology should be made visible as a way to bring into awareness assumptions that we normally take for granted. Moreover, the inversed relation between interfaces and databases interrogates contemporary digital environments, which insist on the privilege of databases over interfaces, the code over the material, and the virtual (considered immaterial) over the physical. Inversions operated throughout the apparatus challenge these conventional assumptions.

Picture 7: An overall view of the installation.

~~**database**~~ deals with the inversed functionality of three technologies: a printer, a video camera and a database. Consequently, it raises issues about the erasure of text, the act of reading in real time (i.e., listening to the reading of a printed text), and physical databases. We challenged the idea of databases as non-linear and digital structures, and the concept of printers as output devices, as well as information recorders. The installation deals with the opposition between presence vs. absence, recording vs. erasure, memory vs. forgetfulness, present vs. continuous time, and reading vs. listening. These concepts are connected with the idea of present time as a time that is always passing by.

It consists of four main interfaces: (1) a printer, with a video camera attached to the printer head that films while the printer prints; (2) a projector connected to the video camera, which projects what the camera "reads" onto the wall; (3) paper sheets completely filled with text, which function as physical databases; and (4) a computer screen displaying a blank digital page.

The initial screen interface consists of a white background. As soon as the user moves the mouse over the "page" the underlying elements become visible. These elements are either black rectangles or keywords from the database. Black rectangles are shown when the corresponding text in the database is not part of the dialectical word-pairs. Conversely, a keyword appears when it references some other word in the database. Examples of keywords are *forgetfulness*, *memory*, *present*, and *past*. When the user moves away from the currently selected elements, either the words or the black rectangles fade away. However, when the user clicks on a black rectangle, it remains on the screen.

After clicking a keyword, it is also replaced by a black rectangle that erases the corresponding word.

After a few clicks, the screen is filled with black rectangles that are used as commands for the printer to navigate the camera. Rectangles resulting from keyword clicks are important navigation instructions for the printer, for this term antonym becomes visible on the projection screen in the process of printing over the previously selected keyword.

The printer in turn prints on a pre-printed page (physical database). Nevertheless, instead of printing text, it erases (covers) the words that the user previously viewed on the screen with black rectangles. Simultaneously, the camera "reads" different words and projects them onto the wall in large scale. These words are antonyms of the ones formerly seen on the computer screen. However, they are not exact antonyms. For instance, the user can read *perpetually* on the screen and *too fast* on the wall; or even *promise* on the screen and *past* on the wall.

After a while, the user realizes she is actually accessing a database of quotes that is on the paper. The quotes are from authors in literature and philosophy who have written about the topics we are dealing with: erasure and recording, presence and absence, actual and virtual, writing and speech. In this context, the paper functions as a physical database. Instead of tables or categories, it is structured in a linear textual form. The process of reading then creates the deconstruction.

The words on the digital paper (screen) are simultaneously commands to erase their corresponding word on the physical paper and commands to project their antonym onto the wall. While the printer is working, the camera attached to it "reads" the paper in a fraction of a second, following the speed of the printer head. This means that the camera allows the reading of text during the process of erasure.

The concept of this project emerged from three main ideas.

- <u>The physical database on a sheet of paper</u>. Physical databases, which use paper as support, are set against digital databases, which use computers as support.

- The printer that reads while it prints. With the video camera, the printer—an output device—turns into an input/output device. Furthermore, the video camera only allows the reading of text in real time.
- The erasure in the process of reading. The erasure of the text, i.e., covering the text with black ink, modifies the database, creating new meanings from the original text.

The printer obliterates rather than inscribes words; the database is stored as marks on paper rather than binary code inside the computer; clicking blocks out visible words rather than stabilizing them; the camera "reads" but does not record; and the projection displays words oppositional to the ones the user has chosen. The inversions create new sensory, physical, and metaphysical relationships between the interactor and computer interfaces. (Hayles, 2003, p. 17)

1.5.1. Databases and Interfaces

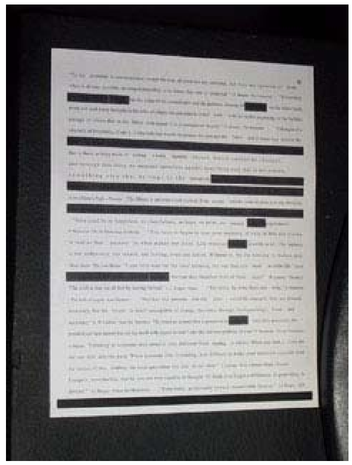
Databases are the expression of our contemporary culture. According to Lev Manovich (2001, p. 219), they are the very representation of our world, which also "appears to us as an endless and unstructured collection of images, texts, and other data records." We should view databases as cultural forms, since their structure is based on fragmentation and non-linearity, concepts strongly related to the post-modern. Computers have frequently been analyzed as "non-linear" storytelling machines (Murray, 1997, p. 86), meaning devices composed of large amounts of data, connected through meaningful associations.

The structure by which information pieces are associated by meaning has been originally envisaged by Vannevar Bush, as it is widely known. Bush, right after World War II, attempted to make sense of the large amount of information that was being produced. The main problem was not how to produce information (because information production was increasing very fast), but how to access it. He concluded that connecting this information in a logical way would be much easier than listing items in alphabetical order, as a traditional encyclopedia does. Bush was also creating a new type of narrative: one that had no previous order, and which was created by the person who linked the available information. This structure was coined by Ted Nelson in the sixties under the name of *hypertext*. Creating Memex, Bush was viewing the world as a database. And for a long time the idea of databases drove people to think that information and code were more important than materiality.

However, Vannevar Bush's greatest contribution was creating a different model of interface to access the huge amount of existing data: an interface based on our way of thinking, rather than on a hierarchical encyclopedic structure. Without the proper interface, databases are meaningless. Manovich (*op. cit.,* p. 37) views the computer environment as a scenario constituted of two main characters: the interface and the database. The database is an assemblage of elements, subdivided into categories, while the interface is a way of accessing the database content, and of rearranging its elements in a linear, human-like way. In this context, diverse interfaces can be created to access the same database, pointing to different "readings" of it. Therefore, the concept of the interface becomes as important as the concept of the database, because one cannot work without the other.

In questioning the traditional distinction between narratives and databases, our installation creates a database that is already a narrative. It is structured in a linear way (and not in categories, as usual), but can only be accessed in a random way. The user only has access to the text on the sheet of paper through the computer screen. Via the screen, parts of the database can be visualized, emphasizing the fragmented structure of the digital environment, as well as the hypertextual model—one can only access parts, never the whole. Similar to a folded map, from which the user can only access fragments, the screen allows just the visualization of certain sections of the database. Moreover, when the user gets the final printed paper it is still not possible to access the whole database, because parts of it have been "erased." Therefore, all interfaces are complementary to each other. Only the three mediums together (monitor screen, video, and paper) can represent the whole database.

In **~~database~~**, each interface (screen/printer, printer/video camera and paper) is a different layer of meaning that allows the user to access data from different perspectives. For example, if the user sees one word on the screen, s/he reads its opposite on the wall, thus creating a tension between what is read on the computer screen and what is expected to be read on the projection. In addition, another tension is created at the moment the paper is printed, because everything that has been read before disappears: the words read on the screen, because they are covered by the printing process, and the words in the projection, because they are lost within the printed text. At the end of the process, the database is modified and takes on another meaning.



Picture 8: ~~database~~'s database after the printing process.

Another important opposition is the tension between physical and digital databases. By placing our database on a sheet of paper, we are inverting the common significance of databases as digital structures and looking back to the predecessors of today's databases: libraries and encyclopedias. But, unlike libraries and encyclopedias, which structure their data in a hierarchical tree-like way, our database is linear—it is narrative. This inversion is related to the comparison that Manovich creates between syntagm/paradigm and narratives/databases. According to Roland Barthes (*Apud* Manovich, *op. cit.,* p. 230), "the syntagm is a combination of signs, which has space as a support." If we take the example of written language, the syntagm represents all the elements that we choose to create a sentence, structured on a piece of paper, whereas the paradigm represents all the virtual words that could be on the paper, but are not actually used. "Put differently, the database of choices from which the narrative is constructed (the paradigm) is implicit; while the actual narrative (the syntagm) is explicit" (*Ibid.,* p. 231). Deleuze (1994, p. 205) argues that this relationship can also be regarded as an actualization of virtual structures in a language. Conversely, Manovich (*op., cit.,* p. 231) affirms that new media inverts this relationship, because the database (the paradigm) is given material existence, while the narrative (the syntagm) is dematerialized. Hence, paradigm is actual; syntagm, virtual. By placing our database on a sheet of paper, it has actually a physical existence; the user can hold it in his/her own hands.

The next two topics are closely related to the inversed functionality of technologies. The first one is connected to the role of the printer as an input device and the act of listening/reading in real time. The second one deals with the erasure of writing.

1.5.2. A printer that reads: real time and the relationship between the inside and the outside

Picture 9: ~~database~~’s printer.

Due to the video camera attached to the printer head, the printer also functions as a reading device. Consequently, instead of being used only as an output device, it also works as an input device, similar to a scanner, but it does not store digital information. A scanner is an electronic device that reads and records information, digitizing analog documents. Generally a printer acts in the opposite way: It prints digital documents and records them on paper, creating analog files. Hence, it withdraws information from the computer from the digital domain to the physical world.

~~**database**~~'s printer works with two basic oppositions. First, the printer does not print, but "erases." Second, the printer (in connection to the camera) reads, but does not record. Therefore, the existence of the text in the projection is ephemeral, because it disappears in seconds, as soon as the printer goes to another line of text.

Here we have the basic and most archaic opposition between reading and writing, or in another perspective, between speaking and writing. Writing was invented as a way of recording information, making it possible to freeze ideas and words for later access. In this context, the interface,[9] that is, the physical support used to write on, was critical for the permanence of writing. Also depending on the interfaces used, writing acquired different meaning. Here traditional writing is used as an example of the importance of interfaces when carrying any type of information. For instance, books made out of parchment lasted longer than others that used papyrus as support. The more durable the interface, the longer the information remained. In opposition to spoken words, which are ephemeral and exist only at the very moment they are spoken, writing has an "infinite" duration (depending on the interface upon which it is inscribed). Therefore, writing deals with time differently than speech does.

This issue becomes clear when we look toward the era before the invention of writing, that is, to oral cultures and their relationship with time. In oral cultures, all knowledge was transmitted by means of speech and storytelling, and therefore stories had to be repeated from generation to generation in order to be remembered. Pierre Lévy (1993), in ***As tecnologias da inteligência*** **(The technologies of intelligence)**, shows how memory evolved from the oral period, when storytelling determined society, passing through the writing period, when time was linearly understood, until the digital age, when a "hypertextual" memory is constructed, that is, narrative occurs by association. In the oral period, time was circular and the act of telling stories was responsible for the transmission of knowledge, because culture was based on oral communication. Narrators and storytellers had a dual role: They were the ones who transmitted and stored

[9] Here we are referring to the expanded meaning of the word *interface*. This concept was born together with the computer culture to designate the mediator between humans and computers (that is, a way of allowing humans to interact with machines). Soon its meaning expanded into other types of mediation, signifying almost everything that could mediate any communication relationship. In another words, the concept of interface can be understood as a way of re-representing information in order to connect two distinct instances.

knowledge (information), as well as the ones who interpreted this information. They were both the databases and the interfaces of that time.

When writing emerged, this relationship was destroyed, creating two separate instances: information storage devices (walls, clay tokens, papyrus) and people who read and interpreted information. Also, writing functioned as a memory device, to the extent that writing replaced memorization. Consequently, it became possible to store a considerable amount of information and later retrieve it. Henceforth, information could be organized in a different way, leading to a more linear thinking, because stories no longer required repetition. The linear reading not only changed our way of thinking, but also transformed the way people dealt with time: from a circular time to a linear time. Linear thinking is a consequence of writing (especially occidental writing) and it was strengthened with the advent of printing.

Now we can suggest that the digital era has again transformed our way of reading: from a linear model to a connected model. In the digital context, telling a story assumes a different significance, because the order is no longer determined by the author, but by the user, who decides which links to follow. This means that the role of the author (that is, the storyteller) has shifted. In contrast to the modern author, who writes a story from the beginning to the end, the hypertextual author is the one who stores information that can be accessed ("read") in a variety of ways. Similarities between this practice and the construction of a database are *not* coincidental.

Although we still do not know how these changes in the way of reading and understanding narrative are going to affect societies, cultures, and ways of interacting with others, we can look at the historical impact of writing on western culture and perhaps imagine the future. Since the emergence of writing culture a new role was developed, that of the reader, in opposition to the narrator. According to Italo Calvino (1981, p. 68),

> Listening to someone read aloud is very different from reading in silence. When you read, you can stop or skip sentences: you are the one who sets the pace. When someone else is reading, it is difficult to make your attention coincide with the tempo of this reading: the voice goes *either* too fast or too slow.

In **~~database~~**, the video camera plays the role of the one who reads. It "reads" the text and projects it onto a wall. Thus the user is only able to read the words at the very moment they are projected. Thus a real-time reading is created, analogous to what happens when someone listens to a narrator. The "reader" is forced to follow the rhythm of the printer, because the user cannot really hold the text in his/her hands. Access is only possible through the printer. In this sense, we can suggest that the interface determines how we read. According to Calvino *(Id.),* "the text, when you are the reader, is something that is there, against which you are forced to clash; when someone translates it aloud to you, it is something that is and is not there, that you cannot manage to touch." ~~**database**~~ combines the concrete actuality of a written text with the ephemeral rhythm of oral storytelling.

Picture 10: ~~database~~'s screen interface: virtual text. The database's text is potentially on the screen, but it is only actualized as long as the user passes the mouse over it.

The relationship between inside and outside, is reflected in the role of the printer in ~~**database**~~. The printer is simultaneously an output device—printing the written text—*and* an input device—reading the text and projecting it onto the wall. As an input device, the printer plays the role of the storyteller, narrating ephemeral words. With ~~**database**~~, we try to subvert the role of the printer: from a recording to a reading device. Once the printer "reads" the text and projects it onto a wall, it is as if the printer speaks, because one can only read the text at the very moment it is projected. The printer's role is analogous to that of a narrator reading aloud. Just as one must follow the rhythm of the storyteller when one listens to a tale, the user must follow the pace of the printer in this installation.

Hence, through ~~**database**~~ we want to call attention to the process of reading or more precisely to the process of listening to a written text. ~~**database**~~ works with written text and subverts its intended function, which is to store information. In the installation, instead of permanence, there is ephemerality. The piece emphasizes the spoken over the written, the fleeting nature of language over the recording of information, and, most of all, it stresses the basic difference between reading and listening. The act of listening, critical to oral traditions, occurs in real time. By real time we mean the present, the moment, as opposed to past and future, and the duration of time. The present is a moment always slipping in two different directions: the past and the future.

Due to the ephemerality of present, humans live in all times, but the present. “To breed an animal that is permitted to **promise**—isn’t this precisely the paradoxical task nature has set for itself with regard to man? isn’t this the true problem of man?” writes Friedrich Nietzsche (1998, p. 35) in **The Genealogy of Morals.** It is the capacity of desiring that makes the human being withdraw from the present and project into the future. Desiring means wanting something that is located somewhere in the future. According to Daniel Dennett, what distinguishes the human mind (Gregorian creatures) from other animals (Darwinian, Skinnerian, and Popperian creatures) is both the capacity to import (mind) tools from the cultural environment as well as the ability to produce a future. Writing is the most important of these tools, exteriorizing our thoughts, and thus largely increasing our memory space. Similarly to Nietzsche, Dennett believes that producing future is the ability to desire, and to take oneself out of the present. He points out that

> an important step toward becoming a person was the step up from a *first-order* intentional system to a *second-order* intentional system. A first-order intentional system has beliefs and desires about many things, but *not* about beliefs and desires. A second order intentional system has beliefs and desires about beliefs and desires, its own or those of others. A third-order intentional system would be capable of such feats as *wanting* you to *believe* that it *wanted* something, while a fourth-order intentional system might *believe* you *wanted* it to *believe* that you *believed* something, and so forth. (Dennett, 1996, p. 121)

It is this capacity to have desires and beliefs about desires and beliefs, that is, to produce a future, that distinguishes humans from other animals. In desiring, we wish and wait, we transgress time, creating a life in the future. The idea of present time as a time that is always slipping into the past and into the future, as something we cannot grab, is exemplified in the video ***Nome*** (Name) by the Brazilian poet and musician Arnaldo Antunes (1993). ***Nome*** is a collection of video clips that work with the opposition between image and writing as well as its relationship to time. One of the video clips, "Agora" (Now), shows images flashing on and off the screen very quickly in succession. There is text in them, but the speed does not let the viewer read a single word. At the same time, it is possible to hear a voice speaking, *"já passou, passou, já passou"* ("gone, gone, gone"). The voice, as well as the images, is cut off producing an awkward feeling, because the viewer can neither hear the words, nor see the images. This feeling is produced by the awareness that time is running so fast that it is impossible to hold on to it, because the present is always gone.

The ability to perceive the future also turns humans into the only animals that are aware of their death. According to Foucault, humans are finite beings and other animals are infinite and immortal because they are not aware that they are going to die. Consequently, they live in the eternal present, since time does not matter. As soon as a human thinks, s/he "merely unveils himself to his own eyes in the form of a being who is already (…) in an irreducible anteriority, a living being, an instrument of production, a vehicle for words which exist before him" (Foucault, 1970, p. 312). Therefore, to Foucault, there are three instances through which humans can learn that they are finite: body, language, and desire.

Knowing ourselves to be finite is essential to our survival as humans. It implies an awareness of death, the ability to believe and desire, and the construction of a life in the future. If we did not have one of these three elements in our lives, life would be unbearable. In the first tale of the **Aleph**, "The Immortal," Borges (1962) tells the story of a man in search of the City of Immortals. On his way, he finds a tribe of troglodytes, men who cannot speak, who do not sleep, and who eat just enough to keep alive. They live in an eternal catatonic state, moving as little as possible, or not moving at all. The author, feeling a compassion for the poor troglodytes, decides to teach one of them how to speak. One day, however, he discovers that this man is none other than the Greek poet Homer, who is actually an immortal. Henceforth, everything else is clear: the Immortals for whom he was searching are in fact the troglodytes. But how are we to believe that a tribe of such disgusting creatures has exactly what everyone on Earth seems to desire: immortality? Borges (*Ibid.,* p. 114) explains that "to be immortal is commonplace; except for man, all creatures are immortal, for they are ignorant of death; what is divine, terrible, incomprehensible, is to know that one is immortal." Having the awareness of one's immortality implies that time no longer matters, because time becomes constant, absolute, infinite. Hence all immortals live in the present: an eternal present, without past or future. In order to exemplify this idea, he tells,

> I have mentioned the ancient quarries which broke the fields on the other bank; a man once fell headlong into the deepest of them; he could not hurt himself or die but he was burning with thirst; before they threw him a rope, seventy years went by. (*Ibid.,* p. 115)

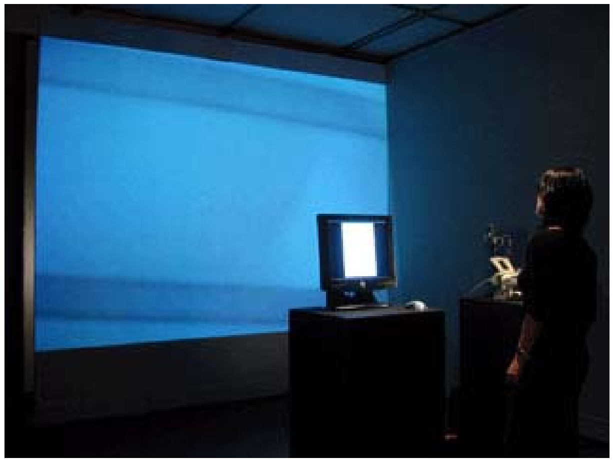
Immortality, thus, according to Borges, means living in the eternal present. For immortal beings, time is of no concern, and its awareness is crucial to making us what we are. The Immortals, in this sense, transform from humans into something else: troglodytes, beings that do not eat, do not act, because they have the totality of time. Consequently, they do not desire, because desiring is only possible if you know that time is dynamic. Desire is localized in the future, and the Immortals have just the present.

This situation implies a compression—or an extension—of all times into one: past, present, and future become one and continuous. Borges also describes the Immortals as motionless beings consumed by thought, petrified by their infinite memory. As a result, the Immortals are in an eternal deeply disturbed state of mind, because they cannot forget. They cannot erase the information they have received during their lengthy existence.

According to Katherine Hayles (2002, p. 103), "seen in the light of this story, the obliterations the printer creates can be read as inscriptions of mortality, non-signifying marks that paradoxically signify the ability to forget, a capability the immortals do not have."

1.5.3. Erasing the writing: time and memory devices

In **~~database~~**, while the printer "reads" the text, it simultaneously covers it. The same pattern the user chooses when reading the text, that is, the black rectangles on the computer screen, is printed over the already printed page, thus "erasing" it. When the user finally holds the paper sheet, s/he can read everything except for what s/he has previously read on the screen. This process emphasizes the necessity of reading in real time: instead of recording, erasing; instead of presence, absence; instead of pattern, randomness.



Picture 11: Time is running fast on the projected wall.

It is possible to talk about erasure from two different perspectives: the physical erasure of writing, and the erasure of memory (regarding both writing and memory as ways of storing information). The first case is exemplified by the palimpsest. The word palimpsest originally referred to "a parchment that has been written upon or inscribed two or three times, the previous text or texts having been imperfectly erased and remaining, therefore, still partly visible."[10] This practice was very common in the Middle Ages, when the parchment used for manuscripts was very expensive and thus it became necessary to "recycle" the used material. What happened, however, was that sometimes the act of erasing was not perfect, leaving marks of the previous text under the new writing. This process could unintentionally create several layers of text on the same surface, generating many layers of meaning.

The palimpsest was created in three steps: writing, erasing, and writing again. In our installation the last two processes are merged together, because the act of erasing and writing over are the same, so that erasure is rewriting. In **~~database~~**, the erasure of the old

[10] Fonte: **Webster's New World Dictionary and Thesaurus**. Fourth Edition. Cleveland, Ohio : IDG Books Worldwide, Inc., 2000. p. 1037.

text already acts as a new sort of writing because it actually does not erase, it covers, producing new meanings in the physical database. The erasure of text involves both its presence and absence, because the text must be there in order to be erased. In addition, our device reads and erases simultaneously, creating a contradictory situation, since reading is the interpretation of writing and writing is a way of storing information. When one erases, reading is not possible anymore, and there is no information left.

According to Daniel Dennett (1996, p. 134), what makes our brain more powerful than the brain of other animals is our capacity to extend our thought into the environment that surrounds us. Our greater intelligence is due to

> our habit of *offloading* as much as possible of our cognitive tasks into the environment itself—extruding our minds into the surrounding world, where a host of peripheral devices we construct can store, process and re-represent our meanings. The widespread practice of off-loading releases us from the limitations of our animal brains. *(Id.)*

Of all the mind tools we acquire in the course of furnishing our brains from the stockpiles of culture, none are more important than words—first spoken, and then written. In this sense, writing was created as a way of extending our memory, and consequently, as a way of not forgetting (or erasing) information.

Hence, if the act of writing frees our memory from the task of remembering, this also means that writing allows us to forget. As a result, it is the act of exteriorizing memory—erasing from memory and writing on paper—that sets it free in order to receive and to record more information. In the tale "Funes, the Memorious" Borges (1962, p. 107) tells about a boy who could remember everything. As long as he had an infinite memory, he was not able to forget. But could he indeed live? After all, "the truth is that we all live by leaving behind" (Borges, *op. cit.,* p. 113). Everything was recorded in his mind: every detail, every moment. For this reason, Funes was not capable of thinking, since he was not able to abstract the world. Also he probably did not have an awareness of time, because as long as everything was recorded in his mind, all times of the past were compressed in the same present time.

An infinite present leads to an infinite memory, because every experience is recorded and none is erased. Whereas memory has generally a positive value, an infinite memory is something negative. The accumulation of infinite memories is almost insupportable and mortals must forget in order to continue to live—or even to think.

The opposite of the idea of remembering everything is addressed by Oliver Sacks (1987) in **The Man Who Mistook his Wife for a Hat**. In the chapter "Lost Mariner" he tells the story of a man, Jimmy, who cannot remember anything. Jimmy, in opposition to Funes, forgets everything. He, however, does not forget the past. His long-term memory is perfect and he is able to remember everything that has happened before 1945. Nevertheless, all events after this date are quickly erased from his memory. For instance, if he talks to someone, he forgets it five minutes later. Nothing can be registered in his memory. Although he believes he lives in the past (somewhere around 1945), he actually lives in the absolute present—a time without past and future. Without remembering, without wishing, he is condemned to NOW. Just like in Arnaldo Antunes's video *(op. cit.),* at the very moment events happen they are already gone. Just like our installation, at the very moment the user reads the words on the projection screen, they disappear on the paper, lost among the innumerable words of the database.

~~database~~ intervenes at the points where words are transported from one medium to another. The automation of printing out a screen or projecting it onto a vertical surface

> make it easy for us to forget the technological mediations that make these everyday activities possible, and more crucially to forget the embedded assumptions they instantiate. Screen text is not print, and a projected light image is not a scanning electron beam. The inscription technologies of screen, print, and projection each has its own specificities, and each constructs the user in a distinctive sensory, cognitive, and material relation. (…) **~~database~~** implies through its focus on remembering and forgetting that the technology is both a machine and an incarnation of assumptions embedded in its form and function. (Hayles, 2003, p. 19)

These assumptions interpenetrate the work, or better, require rethinking the ideology that technological mediated spaces, like cyberspace, are abstract immaterial entities.

Finally, the installation breaks the transparency of the technology, getting across the point that the technology is never neutral, that to use the technology is also to absorb, consciously and unconsciously, the assumptions it embodies.

> "In the center of Fedora, that gray stone metropolis, stands a metal building with a crystal globe in every room. Looking into each globe, you see a blue city, the model of a different Fedora. These are the forms the city could have taken if, for one reason or another, it had not become what we see today. In every age someone, looking at Fedora as it was, imagined a way of making it the ideal city, but while he constructed his miniature model, Fedora was already no longer the same as before, and what had been until yesterday a possible future became only a toy in a glass globe." (Calvino, 1974, p. 32)

2. Defining the virtual: simulation, possibility, potentiality, non-place

The concept of virtual has always been related to our perception of the real. Although Deleuze affirms that the virtual is indeed real—as long as it can be considered something inhabiting a non-place that can be actualized at any time—when it comes to digital space frequently the technological concept of virtual has been viewed as what is not real or could be taken as real. Sci-fi movies, such as **The Matrix** (Wachowsky, 1999), which are going to be analyzed later, ask the question *what is real?* in order to stress the difference between physical and digital spaces. Nowadays we observe the merging of borders between physical and digital[1] spaces.

The purpose of this chapter is to clarify how the concept of virtual emerged in philosophy, in order to apply it to the hybridization of physical and virtual spaces that arises with nomadic technology devices. Therefore, the meaning of virtual has to be redefined in order to encompass the physical domain. Indeed, the concept of the virtual has never been disconnected from the idea of physical, and has always had a close relationship to the actual reality, which is a part of the real/virtual domain. In order to clarify what hybrid spaces are, it is critical to define what virtual is and to identify how this concept has acquired different meanings throughout the history of philosophy. Although the purpose of this dissertation is *not* to make a philosophical history of the concept of the virtual, its analysis will be crucial to explain the merging of borders between physical and virtual in hybrid spaces. The purpose of this chapter is therefore to

[1] Or virtual, as a simulation.

present different visions of the virtual and to show how they have influenced the current idea of virtuality connected to new digital technologies.

There are mainly two trends through which we can analyze the development of the concept of thevirtual. One, which begins with Plato and is later developed by Baudrillard, considers the virtual as a simulation of the real. Being a copy without an original, the simulation surpasses the real, transforming reality in a pure simulacrum. From this perspective, the movies **The Matrix** and **The Thirteenth Floor** (Rusnak, 1999) illustrate how the question *what is real?* has been used by science fiction and philosophy in order to deal with the distinction between mind and body, imagination and reality. This trend focuses on the relationship among representation, reality, and public spaces. The second trend has its origins in the thoughts of Aristotle, who interpreted the virtual as a movement of actualization of a potential reality. Later, Leibniz applies the behavior of single entities to the game of life, choosing to actualize compossible worlds in a linear chain. We will also revise how Deleuze criticizes Leibniz's position and distinguishes possible and potential, envisioning the virtual as desire, as a creation force. The re-creation of real as new opens the pathway to include mobile technologies in the merging between physical and digital.

In summary, the history that we will recount is one that goes from simulations to hybrid spaces. That means going from virtual as a simulated reality—therefore opposing real and imagination, real and its representation—to virtual as the ultimate real. When reality can be viewed as a fold within the virtual domain, virtual becomes potential, and a force of creation. Consequently, the distinction between physical and virtual no longer can be addressed. After all, each reality is merely one face of the real.

2.1. The virtual as simulation: representation, reality, and public spaces

Douglas Engelbart was the first scientist who envisioned computers as tools for digital display. He knew from his days with radar that any digital information could be viewed on a screen. Why not, he then reasoned, connect the computer to a screen and use both to solve problems?[2] At first, Engelbart's ideas were dismissed, but by the early 1960s other people were thinking the same way. Communication technology was intersecting with computing and graphics technology. This synergy yielded more user-friendly computers, which laid the groundwork for personal computers, computer graphics, and later, the emergence of virtual reality. Christianne Paul (2003, p. 125) says that the term virtual reality "was coined by Jaron Lanier, whose company VPL Research, founded in 1983, was the first to commercially introduce immersive virtual reality products," like the data glove, and the head mounted display.

According to Sherry Turkle (1995, p. 29-49), the addition of a screen and a mouse to the computer, followed by the graphic interface developed by the Xerox PARC in the beginning of the 1980s were critical factors that indicated the passage from a culture of calculations to a culture of simulations. While in the culture of calculations computer code and programming languages were used to interact with computers, in the culture of simulations everything was taken at interface value. In this sense, interfaces have been developed to represent the digital world of binary code in a language that would be understandable to human beings. Turkle (*Ibid.,* p. 181) defines the term *virtual reality* as "metaphorical spaces that arise only through interaction with the computer, which people navigate by using special hardware."[3]

Explaining more about the history of VR, Brazilian Professor Andre Parente (1999, p. 28) says,

> The expression "virtual reality" emerged in the end of the 1960s to designate an assemblage of visualization technologies with the aid of the computer. The development of these technologies leaded the creation of the flight simulator, which is, for many people, synonymous with virtual reality."

Likewise, Julian Dibbell (1998, p. 51) understands VR as "every technique ever devised for making the shared illusion of representation come more convincingly alive."And Howard Rheingold (1990, p. 154) suggested that virtual reality would not be "merely" a medium within physical reality, but another type of reality.

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[2] Virtual Reality overview. NCSA (National Center for Supercomputing Applications) and EVL. Copyright © 1995, The Board of Trustees of the University of Illinois. Last modified on 11/27/1995. Available at: http://archive.ncsa.uiuc.edu/Cyberia/VETopLevels/VR.Overview.html. Accessed on: 06 Dec. 2003.

[3] By hardware Turkle means Head Mounted Displays (HMD), body suits, goggles, and data gloves, that is, material interfaces.

> VR is shared and objectively present like the physical world, composable like a work of art, and as unlimited and harmless as a dream. When VR becomes widely available, around the turn of the century, it will not be seen as a medium used within physical reality, but rather as an additional reality.

This thought, widely spread in the 1980s and 1990s, led people to consider virtual reality as a representation of reality, but also as something that could be better than reality. Hence, it could be more realistic than reality itself, becoming a hyperreality. Virtual reality has often been considered a simulation of the real. However, with no original image in physical space, it could be taken as the real.

2.1.1. The virtual as copy

In the Platonic philosophy representations are copies of a superior reality. They are, therefore, inferior to their original. In this sense, Plato considered art and poetry as lower instances, for they were copies of copies. If the sensible world is a copy of the ideal world, art and poetry were copies of the sensible world, which is already a copy. Accordingly, philosophy would be a more "pure" type of representation, since it deals directly with the ideal world. The ideal world, in this sense, is the world of possibles, concepts, which could be actualized in different sensible things.

Plato explains representation as a reflex, a mirroring, and does not differentiate an image in the mirror from the representation of art, poetry, or theater, for they are all copies of the sensible world. "We currently differentiate a corporeal thing from its shadow, from its image, and its reflex. Shadows and reflex refer to the real thing itself. (…) *So*, as the shadows refer to a sensible thing, *so* the sensible thing refers to the idea"[4] (Fink, 1960, p. 84). Eugen Fink (1966, p. 97) still suggests, following Plato, "The painters and the poets produce nothing real, but only images, impotent images, and obviously images from the ordinary reality of the sensible things."[5] Between the thing and its representation there is an intrinsic connection, which distinguishes the object as

[4] "Wir unterscheiden geläufig ein köperliches Ding selbst von seinem Schatten, von seinem Bild und seiner Spiegelung. Schatten un Spiegelung verweisen auf das wirkliche Ding selbst, (…). *So*, wie der Schatten auf das wirkliche Sinnending verweist, *so* verweist analog das Sinnending auf die Idee."

[5] "Les peintres e les poètes ne produisent rien de reel, mais seulement des images, des images impuissantes, et notamment des images de l'ordinaire réalité des choses sensibles;"

real and its image as unreal. Fink (*Ibid.,* p. 87) exemplifies this idea with the reflex of a tree on the surface of a lake, and affirms that one of the characteristics of the copy is that it cannot be confounded with its original. Although the image of the tree has the same visual characteristics of its original, the same colors and shape, we are still able to see through it, where the real lake is. The image, then, is the representation of an object that is not effectively "in water." Therefore, the tree that we see in the reflex is not real—it is only a representation of a real tree that is not actually there. The copy is real as a copy, but unreal as an object. Real, in this case, is the surface on which the image is projected: water, canvas, or mirror. In other words, the interface is real, not the object represented on it.

Michel Foucault (1989) addresses the same issue in the book **This is not a pipe,** when analyzing Magritte's painting with the same name. While the pipe represented on the painting is clearly a pipe, it is indeed not a real pipe, but its representation. An image of a pipe is not a pipe. Moreover, the painting is redundant because it is a canvas inside of another canvas where the pipe is represented. Below the painted canvas one reads the phrase: "This is not a pipe." In doing that, Magritte is twice paradoxical: first, he names something that would be obvious (this is a pipe) and thus would not need to be named. Second, he denies what would be expected (this is not a pipe). Nevertheless, the image of the pipe would not be an image of a pipe if the original pipe did not exist.

Likewise the reflex on a mirror or on the water always depends on its original. The difference between art and poetry and reflected images as copies, however, is that the mirrored images have a temporal dependence on their original, that is, they only exist while in the presence of their originals. The virtual, in this case, is viewed as a represented reality, which is, for Plato, always less than the real itself. The game of the virtual in Plato can be understood as a rhetorical game. The philosopher accuses art and poetry of presenting the false as real, striving to be more real than reality itself. A way of "unmasking" these false realities would be by diminishing their importance within the hierarchy of the worlds.

As we have seen in the last chapter, Couchot (1996, p. 40) uses the Platonic representational model to explain the classical representational model, according to which each point of the canvas has a corresponding point in the physical world. On the other hand, he suggests that digital images have no originals, for they are products of a calculus made by the computer. Therefore, they are simulations, rather than representations.

2.1.2. The virtual as simulation

Simulation, according to Baudrillard (1994, p. 1),

> is no longer that of a territory, a referential being, or a substance. It is the generation by models of a real without origin or reality: a hyperreal. The territory no longer precedes the map, nor does it survive it. It is nevertheless the map that precedes the territory—*precession of simulacra*—that engenders the territory, and if one must return to the fable, today it is the territory whose shreds slowly rot across the extent of the map.

Already in 1893, the writer Lewis Carroll had imagined a 1:1 map in the story **Sylvie and Bruno concluded:**

> "What do you consider the largest map that would be really useful?"
>
> "About six inches to the mile."
>
> "Only six inches!" exclaimed Mein Herr. "We very soon got six yards to the mile. Then we tried a hundred yards to the mile. And then came the greatest idea of all! We actually made a map of the country, on the scale of a mile to the mile!"
>
> "Have you used it much?" I enquired.
>
> "It has never been spread out, yet," said Mein Herr: "the farmers objected: they said it would cover the whole country, and shut out the sunlight! So now we use the country itself, as its own map, and I assure you it does nearly as well."

Forty years later, the Argentinean writer Jorge Luis Borges (1998, p. 325) wrote about the effects that such a map would have on an imaginary empire:

> In that empire, the Cartographer's art achieved such a degree of perfection that the map of a single province occupied an entire city, and the map of the empire, an entire province. In time, these vast maps were no longer sufficient. The guild of cartographers created a map of the empire, which perfectly coincided with the empire itself. But succeeding generations, with diminished interest in the study of cartography, believed that this immense map was of no use, and not impiously, they abandoned it to the inclemency of the sun and of numerous winters. In the deserts of the west ruined fragments of the map survive, inhabited by animals and beggars; in all the country there is no other relic of the geographical disciplines.

Recently, the Italian writer Umberto Eco (1994, p. 95) imagined the instructions for creating a 1:1 map in his 1994 book **How to travel with a salmon**. In "On the impossibility of drawing a map of the empire on a scale of 1 to 1," Eco presents the limitations of the undertaking in a detailed outline of instructions. After all the considerations, Eco concludes that a map that is true to scale is not a logical possibility:

> When the map is installed over all the territory (whether suspended or not), the territory of the empire has the characteristic of being a territory entirely covered by a map. The map does not take into account this characteristic, which would have to be presented on another map that depicted the territory plus the lower map. But such a process would be infinite….
>
> Two corollaries follow:
>
> 1. Every 1:1 map always reproduces the territory unfaithfully.
> 2. At the moment the map is realized, the empire becomes irreproducible.

When the copy becomes more than the original, it consequently destroys the original. Therefore, the era of simulation is inaugurated by a liquidation of all references. On the evolution of the simulacra, Baudrillard (*op. cit.,* p. 6) determines four successive phases of the image. The first one, which corresponds to the representation according to Platonic models, is the reflection of a profound reality. The second masks and denatures a profound reality; the third masks the *absence* of a profound reality; and finally, the last one, the simulacrum, has no relation to any reality whatsoever. Andre Parente (1999, p. 21) suggests that the era of the simulacrum is considered negative by Baudrillard "because the simulacrum is no longer determined by an affirmation of the real as new (free difference) and therefore becomes pure repetition of the same (depotentialized simulacrum)."[6] As a result, the frightening about the simulacrum is exactly its power to transform the real into its shadow.

The idea of simulacrum or hyperreality, which is stronger than reality and which therefore produces the reality is also constructed by Umberto Eco in **Travels in hyperreality** (1990). Hyperreality is defined as what is over or above that which is real. If it is not possible to have the real thing, one fabricates the absolute fake or makes an authentic copy. Eco describes the American culture as the greatest model of hyperreality: Disneyland, wax museums, and Las Vegas are places that pretend to be real, but are actually copies without originals. More specifically, they intend to be more real than reality itself. For instance, if one cannot have the **Mona Lisa**, one constructs a 3D model

[6] "Se para Baudrillard a era do simulacro é negativa, é porque para ele o simulacro deixa de ser determinado por uma vontade de afirmação do real enquanto novo (diferença livre) e se torna pura repetição do mesmo (simulacro despotencializado)".

of the painting and places it in an environment with an ancient atmosphere and sound, mimicking the way she "really" was 500 years Aug. Following this logic, it would thus be possible to access the "real" one, not only its representation.

Hyperreality, in this sense, means to go beyond reality, to transcend it: getting closer to reality and, finally, overcoming it. The American hyperreality can be better observed in places that Eco (1990, p. 3-12) describes as a "fortress of solitude," which was the place where Superman lived. There he was able to remember his past through the miniature copies of his native planet. The United States is full of fortresses of solitude, such as wax museums, fake castles, amusement parks, hotels in Las Vegas, and even odd cemeteries. Inside these places, visitors often have the feeling of being alone, surrounded by the impression that their reactions are unique. This fact can be easily observed in amusement parks like Disneyland, since every time one enters an attraction, one does not realize that there is another group coming right away to have the same experience.

Eco (*Ibid.,* p. 7) also argues that hyperreality is a means of bringing a fake past inside the real present. American society likes to produce copies of a past that has never existed. These copies, in turn, must be realistic, authentic, and even more perfect than they would have been in the past, in order to make this return in time as "real" as possible. The "absolute false" is thus created.

The "absolute false" is, in this case, a means to achieve the "the real thing." In this logic, it is not enough that the copy resembles its original as it is today, but also as it would have been in the past. Visitors of wax museums and fake castles get in touch with a magic past, where there is no distinction between real and imaginary. This distinction, in fact, no longer matters. For example, in Las Vegas one can see side by side Aladdin's castle and the Eiffel Tower. Therefore the absolute unreality appears as a real presence: it is considered real what looks real. According to Baudrillard (1994, p. 19), the existence of this false reality is always a question of providing the real through the imaginary. The author suggests that Disneyland is the perfect model of all orders of simulacra. He sees the "unreal" existence of the amusement park as not opposed to the reality of the city of Los Angeles, which is located in its surroundings. "Disneyland is presented as imaginary in order to make us believe that the rest is real, whereas all of Los Angeles and the

America that surrounds it are no longer real, but belong to the hyperreal order and to the order of simulation.”

It is no longer a question of a false representation of reality, but of concealing the fact that reality is no longer real. The city, according to Baudrillard, has become a scenario. Similar is the role of mass communication media, like TV. Television no longer presents the real; it constructs it. As a result, a fact can only be considered true if it appears on TV. Conversely, the presence of the TV many times influences and determines the construction of reality.

Pushing this idea to the extreme, the movie **The Truman Show** (WEIR, 1998) presents a completely constructed reality, which is taken as real by Truman. The movie does not openly discuss issues about virtual reality, but it raises several interesting issues concerning reality and its representation. How do characters in the real world interact with those in the represented world? What is necessary to create a reality that is no different from the real itself? The premise of **The Truman Show** is that a child is born, an orphan, and for all of his 30 years he is the “star” of a live television show on the air 24 hours a day. Everyone except him is aware of this show. He is isolated from the real world and lives in a represented scenario, which is an island with a huge dome (the largest man-made structure on earth), in which the television show’s producers control everything including the sunrise, sunset, and the weather. The moon up above actually houses the control rooms and it is where the director of the show resides. In this sense, according to the logic of simulation, Truman’s real world is in fact a virtual world, because it is constructed to be a perfect world, better than the real world outside. When asked about the reality of Truman’s life, the director of the show affirms that reality is indeed constructed, and therefore there is no fundamental difference between the real world as we consider it and the real world constructed for Truman.

This construction of a specific reality has been widely discussed in the domain of mass communication media, and until the late 1980s the TV has been most responsible for the dominance of the simulacra. With the emergence of virtual reality systems, especially immersive environments that could represent reality as if they were real, the conflict between real and virtual has increased. As we saw in the previous chapter, computers were created as simulation machines and the digital image has no origin in physical reality. Being simulated realities, virtual worlds have been envisioned, according to the Platonic legacy, as copies of reality. Moreover, if these “virtual” images had no origin in physical reality, they were associated with non-physical and imaginary spaces, and consequently, to non-real spaces.

The distinction between real and virtual spaces, or reality and its unreal copy, has been addressed by science fiction movies, like **Blade Runner** (Scott, 1982), **The Matrix**, and **The Thirteenth Floor**. While in the first one the mixing of the real and its copy occurs in the physical world, **The Matrix** and **The Thirteenth Floor** play with the idea that reality can be just what is inside our minds.

The androids’ hunter from **Blade Runner** was supposed to distinguish between the authentic (humans) and the false appearance (androids). Nevertheless, some androids have become such perfect copies that it was almost impossible to tell them apart from human beings. Since it was no longer possible to discriminate model from copy, androids have become hyperreal entities. They were not only confounded with humans, but also sometimes more perfect than humans themselves.

These movies often opposed real to virtual, confounding virtual spaces with mindspaces and spaces of imagination. Often immateriality has been compared to the mental, while materiality has been considered as belonging to the physical (Cf. Rorty, 1980, p. 20). Consequently, the emergence of this new virtual space, which was not physical but existed outside our minds, addressed again the traditional Cartesian doubt: *Does the mental image correspond to reality?*

2.1.3. Can we believe reality? Descartes and the distinction between the real and the imaginary

Since Descartes, we have become accustomed to the dualism that separates mind and body, immaterial and material. From this dualistic point of view, mind and immateriality are considered better and purer than matter. Descartes, in turn, was deeply influenced by Catholic dogmas. Why was it such a positive value to have your mind downloaded to the information space and set free from the body’s weight? According to the philosopher, if the only indubitable truth is that we think, thus the only reality that we can be sure of is that which is inside our minds. Everything else could be false. Thus, Descartes challenged the veracity of the connection between physical objects and their representation in our minds (Rorty, 1980, p. 45). How strongly has this Cartesian bias influenced the development of the concept of cyberspace in western society?

In the last 50 years, the development of computer simulations and virtual reality created other types of realities that could also be imaginary, that is, that might not exist in the physical world. The opportunity to inhabit and interact with these alternative realities has changed the traditional distinction between real and imaginary. Henceforth, imaginary was not only considered what was inside our minds but also virtual spaces that could be constructed by means of technology and that could be shared with other people.

The distinction between mind and body (or soul and body) is much older than Descartes though. Plato had already defined the concept of *idea* and positioned it above any materialistic form, perception, sensation or even manifestation of reality. However, the idea of knowledge as an inner representation was conceptualized some time later. According to Pierre Vernant (1987, p. 20-37), before Saint Augustine, writing autobiographies was not a common practice, because there was no notion of an interior life or self-consciousness. From the 3rd or 4th centuries on, a profound change in social, religious, and spiritual life starts to take place, configuring a human being with interior and exterior lives. Although the ancient Greeks had been able to write some forms of biography, it is only with Saint Augustine's autobiography, his **Confessions**, that the literature of the inner self emerges.

When Descartes challenged the connection between mental image and external reality, he created the psychological concept of idea. The philosopher was interested in exploring whether the mental image corresponded to the physical world and even if there were a physical world at all (or if everything were just a product of our minds). Therefore, the dualistic notion of mind/body that emerged with Descartes is quite different from the separation between body and soul for the ancient Greeks. Descartes helped to create the concept of mind as consciousness, as an inner existence, in contrast to the concept of mind as reason for the Greeks. More important, there had been no term, even in philosophy or in art, in Greek and medieval traditions similar with Descartes's use of "idea." Nor had there been the conception of the human mind as an inner space in which both pain and clear and distinct ideas passed in review before a single Inner Eye (Rorty, *op. cit.,* p. 50).

Doubting everything but the thought, Descartes questioned whether our perception of the real matches reality. Are we aware of the totality of the real surrounding us? Or is what we call "real" no more than a simulation of the real? In this case, what is the real? How can we know that anything that is mental represents anything that is not mental? Or better, does the mind represent the world? (*Ibid.,* p. 46). Eugen Fink (1966, p. 73) distinguishes between real and unreal in Plato's thought. Effectively, *anything* that is not *real* is real when represented. "There is a real that contains the unreal as semantic content. For example, the chimera and many other fabulous beings do not exist, but the literary production of these beings exist, i.e., there is a real conscience of an unreal content."[7] Similarly, Descartes (*Apud* Rorty, *op. cit.,* p. 56-57), speaking about the imaginary created by painters, says that even if their work represents a purely fictitious and absolutely false thing, it is certain that the colors of which they are composed are necessarily real. Yet Descartes goes further and subverts the Platonic logic, asking how can we be sure whether the sensible world is indeed real?

The possibility of creating a representation of the external world inside our minds, one that could have no connection at all with reality, has greatly contributed to the development of the concept of cyberspace as a mindspace, as a place that could be disconnected from the physical world. Richard Rorty (*Ibid.,* p. 20) explains why there has always been confusion between the concepts of mental and immaterial. He argues that "the opposite of *mental* is *physical* and the opposite of *immaterial* is *material*. *Physical* and *material* seem synonymous. How can two distinct concepts have synonymous opposites?"

The internalization of reality, or the doubt whether physical reality is merely a product of our minds, is recovered by the second cybernetic wave through the argument of Heinz von Föster, Humberto Maturana, and Francisco Varela. As we have seen in chapter 1, the first cybernetics wave was concerned mostly with homeostatic systems and the equilibrium between men/machines and the environment that surrounded them. On

[7] "Il y a un reel qui contient en soi l'irréel en tant que contenu sémantique. La chimère et tant d'autres êtres fabuleux n'existent pas, mais la production de tels êtres par la fantaisie des poètes existe, c'est-à-dire il existe une conscience réelle d'un contenu irréel".

the other hand, the second cybernetics wave incorporated the observer into the system. Von Föster (*Apud* Hayles, 1999, p. 133) inquired in his essay "On Self-Organizing Systems and Their Environments" how one would know that other people existed. He answers that this can be possible because we experience other people in our imagination. Following a Cartesian model, he believed that other people similarly experienced us in their imaginations. "If I assume that I am the sole reality, it turns out that I am the imagination of somebody else, who in turn assumes that *he* is the sole reality" *(Id.)*. Creating a reflexive system, von Föster assumed that if he used his imagination to conceive someone else, then this someone else would use her imagination in order to conceive him. Von Föster used the Cartesian method to think about the articulation between real and imaginary, in order to describe a cybernetic system. Von Föster, however, did not take into consideration Descartes's malignant genius, which would make all this imagination just a product of our minds with no reference at all to external reality.

During the second cybernetics phase, which goes from 1960 to 1985, researchers started to view humans as closed information-processing systems that could interpret, rather than represent, the outside environment. The reflexive organization incorporated the observer into the system, creating interdependency between system and observer. In a strict sense, the outside world could be a model in our minds and not necessarily correspond to external reality. Gregory Batenson (*Apud* Hayles, 1999, p. 78) was a critical figure when it came to the passage from homeostatic systems to reflexive systems. In 1977 he wrote,

> We never know the world as such. We know only what our sensory perceptions construct for us. In this sense, we know nothing about the world. But we know something, and what we know is the end result of the internal processes we use to construct our inner world.

Batenson *(Id.)* believed that the microcosm of the inner world was functional within the larger ecosystem only because it was an appropriate metaphor for the macrocosm. In this sense, we are a metaphor not only for ourselves but also for the larger system in which we were embedded.

The most famous paper from this period was the classic article titled "What the frog's eye tells the frog's brain." In this article, Lettvin, Maturana, McCulloch, and Pitts (1959) demonstrated that "the frog's visual system does not so much *represent* reality as *construct* it" (Hayles, 1999, p. 131). While studying the animal's perception of colors, they found out that there was no one-to-one correlation between its perception and the environment. Maturana (*Apud* Hayles, *op. cit.,* p. 136) suggested then,

> to speak of an objectively existing world is misleading, for the very idea of a world implies a realm that preexists its construction by an observer. Certainly there's something "out there," which for lack of a better term we can call "reality." But it comes into existence for us, and for all living creatures, only through interactive processes determined solely by the organism's own organization.

This means that every reality (or whatever is out there) is a mediated reality, because there are no pure means to know it.

The authors also found out that a frog hunts and escapes mainly by vision. Moreover, a frog is not concerned with the stationary world, and only pays attention to fast-moving objects. They inquired how the frog abstracted what was important to it from the surroundings. Generally we tend to think that the eye senses light, and the local distribution of light in the eye is copied to the brain, which does the further processing. However, they discovered that the eye itself detects certain patterns of light and their changes, corresponding to particular relations in the world. The frog, in turn, best responds to small and dark moving objects that enter its field of vision. This operation produces a behavioral feeding response of turn, jump, and eat. Consequently a frog, while perceiving the external world, constructs its own reality as a closed system. At this time, participants from the Macy Conferences quickly extended this phenomenon to humans, interpreting humans as closed-system information processors, and as constructors of their own realities. What was true for frogs must also be true for humans, for there was no reason to believe that the human neural system is uniquely constructed to show the world as it "really" is. According to Hayles (*op. cit.,* p. 148),

> autopoietic theory, in its zeal to construct an autonomous sphere of action for self enclosing entities, formulates a description that ironically describes autistic individuals more accurately than it does normally responsive people. For the autistic person, the environment is indeed merely a trigger for processes that close on themselves and leave the world outside.

For Maturana (*Apud* Hayles, *op. cit.,* p. 143), however, observation did not mean that the observer remained separate from what was being observed; on the contrary, the observer could only observe because she was structurally coupled to the phenomenon she saw. Maturana and Varela named this phenomenon autopoiesis.

Norbert Wiener (*Ibid.,* p. 141) then asked what if an autopoietic system is encapsulated within the boundaries of another larger autopoietic unit? In response, Maturana *(Id.)* created the concept of allopoiesis, signifying a system that was enclosed within another system. Consequently, while autopoietic units were only concerned with producing their own organization, allopoietic entities cared for the organization of a larger system. The car is again an important cybernetic example. An automobile can be envisioned as an autopoietic unit, but when somebody is driving it, the car is functioning according to the driver's commands. Therefore, it is functioning allopoietically.

The relationship between the inside and the outside has always been critical for cybernetics theory, as well as for philosophy and science fiction. Philosophy and cybernetics faced this dialectic basically as a problem between real and imaginary (or real and mental) constructions. The emergence of cyberspace and virtual reality systems influenced science fiction by confounding virtual with mental, and imaginary with unreal. If cyberspace, as we have seen, has been constructed as an immaterial and simulated space, when the word virtual was applied to the informational domain it had clearly a dialectic opposition to material and, therefore, physical. Virtual has then been used as opposed to real.

2.1.4. What is real? Mobility and innerspace in sci-fi

The movies **The Thirteenth Floor** and **The Matrix** inquire whether the world we take for real is indeed real or just a simulation of reality. Ultimately, both ask what reality is, and address the difference between physical and virtual spaces. **The Matrix** embraces firmly Descartes's doubt, questioning whether reality is external or internal to our minds, placing the simulation inside our brains. On the other hand, **The Thirteenth Floor** places people (avatars) inside the simulation. It also deals with the idea of reflexivity, as it places one simulation inside another simulation, which is inside another simulation. In the end, how many simulations are there? Interestingly, the connection between physical and virtual is accomplished through the idea of mobility. Only the mobility of the characters allowed them to move across spaces, heading toward what I shall call a *hybrid reality.*

The Thirteenth Floor begins with Descartes's famous quote, "I think, therefore I am," suggesting that physical presence is not as important as mental presence, that is, our existence only depends on what we think. However, as the movie develops, we perceive that human existence also depends on technology and that Descartes's doubt is exactly the point which the movie tries to subvert: Physical presence is indeed important.

This is not the first movie that deals with the idea of simulated spaces by means of philosophical questions. **The Matrix** had accomplished a similar goal, yet in a different way. Early in the film, while the main character Neo (Keanu Reeves) works on his computer, we are able to see a book on his desk. It is **Simulacra and Simulations**, from Jean Baudrillard *(op. cit.),* suggesting that the main idea of the film (also *what is real?*) is constructed by the concept of reality as a simulated space. How can we distinguish reality from simulation, physical from virtual? Similar to Descartes's doubt, the challenge in both movies is to know whether reality is indeed real or simply a simulation running inside computers (and downloaded into human minds). In **The Thirteenth Floor,** the answer for this question is apparently clear since it is almost evident that there is a simulated world that follows the model of the "real" world. On the other hand, in **The Matrix** there is no evidence of it until the middle of the film, when we discover that what we think is "real" is just a simulation for our minds to live in (similar to **Neuromancer's** idea). Is this simulated world a copy of our "real" world? Or is it a copy without an original, a world of data as in **Neuromancer**?

The main issue in both movies is exactly how the connection between physical and digital environments can be created. In **The Matrix** there is no connection at all between the two domains. Machines lived in the physical world and humans "lived" in the digital world. Only some special mortals could have the power to *move* through both domains and have the awareness of the world's reality. For them was given the power of mobility, which allowed them to have the consciousness of the interplay between physical and digital spaces.

Nevertheless, the majority of human beings had neither consciousness nor movement. They "lived" in a simulated space. Similar to Descartes's idea, their world's appearance had no connection with reality at all. On the other hand, in physical space they could not move, since they were connected to wires and cables. The absence of movement in the movie can also allude to the way people are used to connecting to cyberspace and virtual reality environments: static interfaces that detach users from the physical world.

Programmed human minds were represented in virtual reality, but their physical bodies were imprisoned in the physical world, connected with cables and wires, being used as batteries. They were condemned to live in the digital space because of their inability to move in physical space. Hence, the separation between reality and simulation is addressed through the absence of the possibility of movement. *Immobility avoids the connection between physical and digital.*

Neo, as one of the chosen people to whom was given the power of movement, breaks up the enclosure, beginning his life in the "real" world and thus connecting the real and the simulation. The idea of a virtual space as a simulation that mimics the physical world is not literally represented in the movie. The "matrix" of the movie's title, which is a virtual space created by machines, is not a simulation of the machines' world. It is a re-creation of the humans' world. Therefore, it is similar to a dream space, built for the human mind. This means that the matrix is a simulacrum, with no reference or origin in reality. The matrix creates another reality, which we believe is the real. Hence, it intends to be more real than the real itself because reality is in fact a dark and empty world inhabited by machines. The idea of constructing a simulated world that is better than its model follows Umberto Eco's concept of hyperreality. In this sense, **The Matrix** is an attempt to create a hyperreality.

In the movie, people no longer enter the virtual space. They belong to it. Something similar happens in **The Thirteenth Floor**. There are virtual personas that actually live an independent life inside the simulation. While in **The Matrix** people who lived in the simulation were born in the physical world, **The Thirteenth Floor's** characters are meant to be completely programmed entities. At first glance, they seem to be like Karl Sims's creatures or cellular automata.[8] However the movie's development shows that this first impression is erroneous. Virtual personas are modeled after real people and they can sometimes feel sensations that belong to their models.

[8] See chapter 1 for simulations of life in virtual domains.

The complexity in **The Thirteenth Floor** arises, then, when we perceive that physical and digital spaces are so interconnected that one cannot realize which one is the reality and which one is the simulation. Also, opposite to **The Matrix**, where the absence of movement avoids connections between physical and digital, **The Thirteenth Floor** explores the complexity that happens when movement occurs.

In this movie, the question is no longer *what is real?* because real encompasses physical and digital, but *what is the connection between physical and digital spaces?* Not only "real" people are able to download themselves into the simulation, but digital personas also have the capability of transporting themselves into physical space. Also, avatars (virtual bodies from "real" characters) are able to feel sensations that belong to their models, showing that one world is able to influence the other. If avatars are able to live in both spaces, the question *what is real?* arises again, but with a slightly different connotation, since it is no longer possible to separate digital from physical. Therefore, real must be redefined in order to encompass movement, physical and digital, creating a hybrid reality, as we shall see in chapter 5.

The Thirteenth Floor deals with complex behaviors that might happen whenever the digital starts to merge with the physical. At first sight, avatars seem to have no physical distinction from their models. Nevertheless, they could have completely different personalities, which were sometimes incompatible, generating some strange episodes, like when Hannon Fuller (the owner of the company located on the 13th floor of a building in Los Angeles in 1999) decides to "jack in" the 1937 simulation embodied in his digital persona, Grierson. Whenever Hannon downloads himself to the virtual place,[9] he uses Grierson's body (which is modeled after his own). Grierson is a serene old bookseller who decides to go to nightclubs and have sex with young girls while being "used" by Hannon. When Hannon decides to go back to the "real" world (1999), his avatar becomes Grierson again, who retains some vague memories of Hannon's behavior. He remembers doing strange things while "sleeping." And his old wife often complains about his "strange" behavior. The sensation that we have is, thus, that events are not happening properly.

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[9] Virtual as a simulation space.

As a result, after Hannon creates the 1937 simulation, he is murdered in the 1999 simulation by a character from the "future" simulation. Being a digital persona as well, Hannon was not supposed to create a simulation inside a simulation, which would interfere with the development of the 1999 simulation, which we had believed was "the real world."

Similarly, Jane Fuller, who downloads herself to the 1999 simulation as Hannon Fuller's daughter, also breaks up the borders between reality and simulation. Coming with the goal to shut down her father's company, she falls in love with Douglas Hall, Hannon's employee, who was modeled after her husband, David. However, while her husband has become an aggressive serial killer, Hall was sensible and intelligent. Being aware of the affair between Jane and Douglas, Jane's husband also downloads himself into the simulation, in order to kill her in the digital space. Yet how can actions taken in the digital space affect the physical world? At this point, who is in the digital space and who is in the physical space?

The connection between physical and digital does not happen merely because physical characters are able to "jack in" the simulation, but also because digital personas have the possibility to come to the "real" world, ascending from the simulation. Every time a person is killed while its representation is embodied in the simulation, the avatar is uploaded to an upper level of the simulation. For instance, when Jason Whitney (one of the company's programmers) is killed while embodied in his digital avatar, Jerry Ashton, Ashton automatically goes to the 1999 simulation. Coming from 1937, he is absolutely surprised with all the technology that he sees. Meanwhile, he meets Douglas Hall, who was Whitney's partner. However, at that moment, Hall's body was being used by David, his model in the future simulation. David then kills Ashton, because Ashton was not supposed to be in that simulation. Characters from the future and past parallel worlds meet in the middle level and the events that come up from these meetings change the whole story. Therefore both (or the three) worlds could be connected, but they were not supposed to. That is why Jane Fuller comes back to 1999: She wants to stop simulations from running on top of other simulations, and keep different types of realities from connecting to each other. When a "real" model downloads itself into the simulation, its functioning can be affected, generating possible errors. The model's action is similar to a virus in the system. It crashes the simulation.

In addition, opposite to **The Matrix**, all the agents from **The Thirteenth Floor's** simulations have consciousness (although they were not supposed to) and they are likely to have non-programmed behaviors. This explains why Hannon in 1999 discovers that his world was actually a simulation from another reality and why Ashton in 1937 is so upset when he finds out the same. They are disappointed because their perception of the world has been proved false. Since characters start to question their own reality and the environment in which they live, they no longer have an automata behavior. Similar to Karl Sims's agents in **Evolved Virtual Creatures**, Fuller and Whitney learn from the environment and start to have unpredictable behaviors. That is why the "real" characters lose control of the simulation.

The construction of the 1937 simulation, as well as the 1999 virtual world, were attempts to create imaginary places, which were copies of past realities. However, as the movie develops, both simulations prove to be as real as the "real" world. Actually, for H. Fuller, the simulation was better than the "real" world, like a hyperreality, and he gets addicted to it. On the other hand, the 1937 past simulation was modeled entirely after the imagination of Fuller. What is then the distinction between real and imaginary?

As we shall see in the next chapter, online multiuser environments represented outside fiction the construction of imaginary and virtual (simulated) worlds according to their inhabitants' fantasies. Moreover, similar to the simulation in **The Thirteenth Floor**, they require that the user chooses or defines an avatar. The virtual world's interface—textual or graphical—connects the user in the physical world to the virtual environment. Therefore, the avatar allows one to "inhabit" the virtual environment.

Science fiction has contributed to bring up a world where the thin layer that separates digital from physical becomes transparent. In **The Matrix** it is possible to enter the simulation through the user's own body. Therefore, the user becomes its own avatar, and the boundaries between physical and digital are softened. In addition, **The Thirteenth Floor** deals with what could happen if we could walk in and out of digital spaces, having them influence our lives in physical space. Yet with mobile technology devices people no longer *enter* the virtual space. They also live in it. This does not mean, however, that William Gibson's goal has been achieved and that it is now possible to connect to cyberspace via neural implants. Conversely, the concept of virtual space has changed, no longer meaning a simulation detached from physical reality.

The Thirteenth Floor, although based in the concept of virtual space as a place for the mind, addresses contemporary issues like mobility and transparency, when characters move freely between physical and digital spaces. Also it is never clear in the movie which is the virtual space and which is the physical space.

Nowadays, due to the emergence of nomadic technology devices, the concept of virtual space should be reconsidered. At first regarded as a simulation of reality, or a representation without an original, following the Platonic model, the virtual space can now be defined according to the Aristotelian/Deleuzian model of virtual as potential. This perspective does not oppose virtual and physical, for physical becomes a fold within the virtual. If the real can be unfolded in different possible realities, the virtual and the real are actually synonymous and the reality, or physicality, becomes one of the faces of virtual. This statement is clarified when we look backward to the origins of the concept of the virtual according to Aristotle.

2.2. The virtual as possible

2.2.1. The movement from the potential to the act

The Greek philosopher Aristotle initially created the concept of the virtual in order to think about movement—not the physical movement of objects in space, but rather the change of a being's state. It is therefore related to qualitative changes: a green leaf that becomes yellow, or an illiterate man that becomes literate. Virtual, in this case, is the passage from the potential to the actual state (which is the realization of an action and, therefore, corresponds to a static state in the end). Aristotle then incorporated movement to each particular being, in contrast to what is defined in modern physics, where movement is relative to an observer.

The philosopher started to think about potential states to solve a problem formerly addressed by Parmenides: How would the non-being generate the being? Aristotle then addressed the two classical aphorisms related to movement: (1) how does the being arise from the non-being? and (2) how does the same become the other? According to Parmenides there was no potential state. Therefore, the passage from the non-being to the being would necessarily represent the former one's death. This concept originated several paradoxes. The first one was related to conceiving movement as a birth, that is, from the nothingness something would arise. From this point of view, it would be impossible to learn, since either one already knows, or one does not know anything, even what to learn. In abstract terms, for Parmenides there was only the being (the literate) or the non-being (the illiterate) and the non-being could not generate the being. The second paradox was connected to considering the act of becoming as a death: when one becomes something it ceases to be what it was before. Therefore, Plato used to say that if one would like to turn somebody into a sapient, one would be a killer. Aristotle then created a third state of the being, which was the potential being: although being illiterate, one had the potential to become literate, and the act of learning was exactly the movement from the potential to the act. As a result, virtual means the process of transformation into what a being can be but is not yet.

Aristotle believed that objects in the lunar sphere lived in absolute rest, whereas entities in the sub-lunar world had the quality of movement. In this sense, he distinguished between absolute immobility, which was the opposite of movement, and rest, which was the absence of movement. Consequently, if an entity were able to move, it would be capable of passing from one state to another. The act of becoming was a qualitative change, related to one specific being. The problem was no longer, as understood by Parmenides, the non-being becoming the being and consequently a different entity, but how to distinguish attributes from a subject. According to this perspective, the subject remained the same, but its attributes could change. For example, a triangle can be equilateral, or isosceles, or scalene, and still be a triangle. The equilateral triangle has the potential to be isosceles, but it is not. It is therefore an imaginary movement, which dissociates the unity of the being into a subject and a predicate. According to Pierre Aubenque (1962, p. 431), "one can say that the illiterate becomes literate, but also that a man becomes literate; the one which becomes is both the one which was and will no longer be, as well as the one which will still be, when the one which was will no longer be.”[10]

When an illiterate man becomes literate, he does not cease to be a man. Simultaneously, this man has in himself the potential to learn, actualized when he becomes literate. The essence of the being remains the same, regardless of accidental attributes. Aristotle affirmed that the acquisition of knowledge, for example, consisted in the actualization of potential knowledge. If potentiality implies immediately the reference to a possibility, this was the possibility of actualization, the possibility of becoming another. This is the difference between the act and the potential for Aristotle: While the potential state corresponds to the movement of achieving the act, the act is a finalized potential, a result. The virtual, in this sense, is movement (potentiality), and the act is the immobility, that is, the result. The immobility of the act is the immobility of a product, which presupposes a former movement.

Consequently, each being is a multiplicity, for it contains in itself diverse potential qualities, which can be opposed to each other, but are actualized one at a time. Contraries could only exist in the potential state; once actualized, there can be no opposed qualities in one single being.

We have seen in chapter 1 that the Aristotelian concept of space did not correspond to a space per se, but to places, which were represented through particular entities or beings. It is interesting to notice here that the same occurs with the concept of virtual. The virtual for Aristotle was not applied to reality as a whole, but only considered for single beings. In the seventeenth century, the philosopher Gottfried Wilhelm Leibniz uses the Aristotelian idea of potentiality on beings and applies it to possible worlds.

2.2.2. Incompossible worlds and the best of all the worlds

In the 17th century Leibniz created a world composed of many incompossible worlds, or scenarios. All of them are possible, although they cannot coexist with each other, since they contain incompatible elements. As with Aristotle, contraries could not

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[10] “On peu dire que l’illetré devient lettré, mais aussi que l’homme devient lettré; ce que devient, c’est aussi bien ce qui était et ne sera plus que ce qui sera encore, lorsque ce qui était ne sera plus.”

exist in the same series of worlds. For that reason there could be lots of virtual worlds, although only one would be actualized at a time. In the very moment one world becomes actual, it automatically excludes all other incompatible possibilities. Thus, time (or reality) consists of a chain of actualized possible worlds compatible with each other. Furthermore, Leibniz argues that although different sequences of worlds can be possible, the best sequence of all has been chosen and actualized by God. In the **Theodicy** (Leibniz, 1934, p. 263), the philosopher explains, "Here are representations, not only of what happens, but also of everything that is possible. Jupiter reviewed them all before the beginning of the existing world, arranged the possibilities into worlds, and chose the best of them all."

According to Deleuze (1991, p. 95), Leibniz's theory is substantially different from the one proposed by Plato. He absolutely does not refer to

> a duality that would make our relative world as a reflex of a more profound absolute world; conversely, he makes our relative world the only possible existent world, a world which repels other possible worlds, because it is relatively "the best." God chooses among an infinity of possible worlds, incompossible with each other, and chooses the best of all, or the one which has more possible reality.[11]

As a result, only the enchainment of compossible worlds is able to be actualized. Leibniz suggests that two contradictory facts are often both possible, but questions whether they can exist simultaneously. For example, Adam, the sinner, can only exist in the same world chain as Judas, the betrayer. Hence Deleuze (*Ibid.,* p. 94) calls compossible (1) the assemblage of the convergent series that constitute a world; and (2) the assemblage of monads which express the same world (Adam the sinner, Caesar the emperor…). Likewise, he calls incompossible (1) the series which diverge and thus belong to two possible worlds; and (2) the monads which each express a different world (Caesar the emperor and Adam the non-sinner).

Although Leibniz envisions the world as a multiplicity and generalizes to a broader experience what Aristotle has confined to a single entity, his mechanism of actualization of possible worlds is completely determined. In the **Theodicy**, the

[11] "Leibniz de modo algum reintroduz uma dualidade que faria do nosso mundo relativo o reflexo de um mundo absoluto mais profundo; ao contrário, ele faz do nosso mundo relativo o único mundo existente, mundo que repele os outros mundos possíveis, porque é relativamente 'o melhor.' Deus escolhe entre uma infinidade de mundos possíveis, incompossíveis uns com os outros, e escolhe o melhor ou o que tem mais realidade possível."

philosopher affirms, “neither the present nor the past could be changed; they are already necessary. But the future, in itself susceptible of change, becomes, through foreknowledge, fixed and necessary” (Leibniz, 1934, p. 258).

Leibniz excludes arbitrariness and liberty from the game of the world. Frequently the philosopher proposed human freedom, but in the end it turns to be simply the freedom of God, for God was the one who chooses everything. In the baroque game, God plays but also determines the rules. Possible worlds cannot come into existence if they are incompossible with the series chosen by God. That is why, as we are going to see, Deleuze (1994, p. 211) distinguishes Leibniz’s idea of possibility from the concept of potentiality. Similar to Leibniz, Aristotle spoke about potential states of beings, although his definition of potential excluded arbitrariness and creation, for something could only become if it already contained an inherent potential to do so. The transformation was never aleatory or unexpected. Conversely, an act of creation is always ready to emerge, to become, over and over again. The Aristotelian actualization is a single act, that is, once something goes from the potential state to the actual state, the movement is over.

2.2.3. The game of life: all possibles at once

Eugen Fink (1960, p. 93) proposes the game as a symbol of the world, when distinguishing between the Platonic concept of the game and the game as haphazard and liberty. Plato considered the theater as a game of appearances, which was merely a representation of life, no more than paintings or poetry that represented the sensible world. The Platonic game was composed of masks, and the final goal was to be able to separate game and real life, imaginary and real. Ultimately, the aim of the Platonic game was to find out the “true identity” behind the mask—to unmask. As opposed to mental entities, which are unreal representations of the real inside one’s mind, the game would be an unreal representation of reality inside physical space. Being a non-serious and ludic activity, the Platonic game has been related to the role playing and constructing new identities, which could be different from the “real” identity. This idea has been used, as we are going to see in the next chapter, to analyze multiuser environments in the Internet. In such environments, the user creates an avatar to be her/his representation in the virtual world. However, constructing an avatar was like constructing another persona—who one wished to be, or wished to appear to others. The question was, then, how many new identities can one create? And how are these identities different from one's real identity? Therefore, the perception of multiuser environments as places to mask one's true identity corresponds to a Platonic critic.

According to Fink (1960, p. 78), following Plato's logic, while playing a game "we can be everyone, every possibility is opened, and we have the illusion of freedom."[12] This argument partially explains why the Internet and especially why multiuser environments have been considered places of liberty. However, as Fink (1966, p. 109), points out, this freedom is just an illusion when the game is just an appearance. Like the simulacrum, the game becomes the potentiality of the false.

For Plato the reality of a game is the reality of an appearance, or a mask. Moreover, a game is the representation of our imagination. In this sense, the philosopher suggests that an image as a representation is different from a game as a representation only because the last one is a process, always becoming, while the former one is a product: it has already become. Nevertheless, both represent the unreal/imagination framed by the real.

When is the game not only an illusion or ludic role-playing? According to Fink *(Id.),* that happens when this game coincides with life itself. From this perspective, our whole life can be considered a game, in which each of us is born as a multiplicity, having all possibilities in front of us, just ready to become. The virtual is multiple. In this sense, one can consider that the child is undetermined and the elderly determined, for she/he has already actualized a series of possible worlds. Fink (1960, p. 80) suggests that only through the game is it possible to create new paths, choose new opportunities, and go in different directions.

Leibniz has indeed envisioned life as a real game, not just as an appearance. Such a game, however, was defined by God. Conversely, Mallarmé and Nietzsche envisioned a world where there were no rules for the game, for it happened by chance. The throw of the dice meant that anything could happen. According to Deleuze (*op. cit.,* p. 104),

[12] "Wir können alles sein, alle Möglichkeiten stehen offen, wir haben die Ilusion des freien."

> Nietzsche and Mallarmé (…) address a world without principles, a world that lost all its principles: that is why the throw of dice is the potential to affirm the Chance, to think about all the chance, and this is, most of all, not a principle, but the absence of all principle.[13]

Therefore, the game is no longer determined and becomes an act of creation.

Borges (1962, p. 19) goes beyond Leibniz's theory in "The Garden of the Forking Paths." Instead of accepting the existence of one linear series of worlds, the Argentinean writer constructs a model where all possibilities are actualized at the same time. "In all fictional works, each time a man is confronted with several alternatives, he chooses one and eliminates the others; in the fiction of Ts'ui Pên, he chooses—simultaneously—all of them" (Borges, 1962, p. 26).

According to Deleuze (1988, p. 98), Borges chose to invoke the Chinese philosopher rather than Leibniz because he desired God to bring into existence all the incompossible worlds at the same time, instead of choosing one, the best. Borges viewed the virtual as the multiple possibilities that could coexist and that would have no rule to be actualized. If the Chinese philosopher left to write an infinite book that could embrace all possibilities of time, the choices that one can make in the game of life are also infinite. Moreover, every time a choice can be made, there are several other (incom)possible worlds striving to be actualized all together. Borges demonstrates this when the main character was about to murder Stephen Albert and feels "the swarming sensation" he had already felt before. "It seemed to me that the humid garden that surrounded the house was infinitely saturated with invisible persons. Those persons were Albert and I, secret, busy and multiform in other dimensions of time" (Borges, 1962, p. 28).

Consequently, there is no longer a subject who chooses among several worlds, as in Leibniz, but a subject who is pressured by several selves. These selves, however, are not masks or appearances, but all of them constitute the same person. The emergence of possible selves transforms the virtual as a distant instance to something that is already here, ready to emerge, to be created, or to transform.

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[13] "Nietzsche e Mallarmé (...) tratam de um mundo sem princípio, de um mundo que perdeu todos os seus princípios: por isso, o lance de dados é a potência de afirmar o Acaso, de pensar todo o acaso, e este, sobretudo, não é um princípio, mas a ausência de todo o princípio".

2.3. The virtual as potential

Gilles Deleuze (1994, p. 212) considers the virtual as desire, as a potential of creation. Viewing the virtual as potential, Deleuze suggests that there is more beyond what we see in reality, for the real does not include all its potentiality of realization inside a given reality. Therefore, the real becomes the potential to produce new realities. From this point of view, the virtual is more real than reality, rather than an unreal instance. Consequently, all opposition between real and virtual no longer makes sense.

Exploring this sense of virtuality, Deleuze *(Id.)* suggests that differentiation is creation. Differentiation is synonymous with actualization, since in the movement from virtual to actual an idea or a concept can potentially be differentiated into several actual instances. The potential to be actualized and differentiated into diverse realities is what makes the virtual an important part of the real rather than opposed to it. "The virtual is fully real in so far as it is virtual," says Deleuze. (*Ibid.,* p. 208) The virtual is always ready to emerge, to have actual existence. Deleuze focuses on the process of actualization as acts of differentiation, genesis, or creation. In this sense, artworks can be perceived as incarnations of potential ideas and desires, manifestations of potential structures. According to him, the act of creation in art occurs not between two actuals but between the virtual and its actualization.

The movement from virtual to actual (actualization) can be used to think about media art works as virtual pieces. Every artwork can be envisioned as a virtual piece, which is differently actualized by each viewer. Therefore, participatory pieces per se are fully potential entities that can only be completed when the interaction with the user occurs. Each user, in turn, actualizes the artwork in a different way, revealing some (but not all) aspects of its potentiality.

However, contrasting with Fink (1966, p. 80), who says that each human being is born undetermined (and therefore full of potentiality), Deleuze (1994, p. 209) suggests that the virtual is completely determined. "When it is claimed that works of art are immersed in a virtuality, what is being invoked is not some confused determination but the completely determined structure formed by its genetic differential elements, its 'virtual' or 'embryonic' elements."

Also important is the distinction between potential and possible. Deleuze argues that the possible is opposed to the real, while the virtual is opposed to the actual. Consequently the process experienced by the possible is a *realization*, whereas the process of the virtual is its *actualization*. Furthermore, the possible is not real (even if it can become real) and the virtual possesses a full reality by itself. So, while the real resembles the possible, there is no similarity between the actual and the virtual: sometimes the actualization responds to a problem that was not previously defined. The realization of a possible action eliminates its state of possibility, but ideas do not disappear with their solutions, since they are an indispensable condition without which solutions would not exist.

In this sense the virtual in Deleuze distinguishes from the idea of representation in Plato. According to the representational model, concepts are like possibilities, whereas the virtuality of the Deleuzian idea has nothing to do with possibility. Ideas are multiplicities. The frightened face that suddenly appears and looks at the calm world in **What is philosophy?** (Deleuze, 1994, p. 17) is an example of a potential world wanting to emerge in the actual world. In this sense, the virtual is always absently present, constantly desiring to be actualized and differentiated. Actualization is, then, a genuine act of creation, and it does not result from the limitations of a pre-existing possibility, as with Leibniz.

The game for Deleuze is also an act of creation. Life as a game means no distinction between real and virtual. Paraphrasing Mallarmé's **A throw of the dice will never abolish chance,** Deleuze (1994, p. 200) says, "It is the bad players who repeat only by fragmenting chance and dividing it among several throws. By contrast, the good throw of the dice affirms all of chance in one throw."

Brazilian Professor Andre Parente (*op. cit.,* p. 14) defines the virtual as a desire to constitute the real as new. In this context Deleuze, as well as Félix Guattari, Pierre Lévy, and Jean-Louis Weissberg, considers the virtual as a function of the creative imagination as well as a product of different articulations among art, technology, and science. Therefore the virtual is capable of creating new conditions to model the subject and the world.

2.4. Virtual as a non-place

There is still another philosophical perspective, which views the virtual as a non-place capable of containing innumerable distinct places. Foucault (1994, p. 364) defines heterotopias as opposed to utopias: While the latter are sites with no physical location, heterotopias are physical places composed by virtual components. In this sense, heterotopias call forth virtual entities that are not yet actualized but are on the threshold of actualization. "Places of this kind are outside of all places, even though it may be possible to indicate their location in reality,"[14] argues Foucault (*Ibid.,* p. 363). Moreover, these places are absolutely different from the sites about which they reflect.

The philosopher takes the mirror (also the archetype of the Platonic representation) as a peculiar example of both a utopia and a heterotopia. On one hand, it is a utopia because it is a placeless space. "In the mirror, I see myself there where I am not, in an unreal, virtual space that opens up behind the surface; I am over there where I am not"[15](*Ibid.,* p. 364). On the other hand, it is a heterotopia because the mirror itself does exist in reality. Interestingly, there is a counter-movement where the virtual image reflected on the mirror induces changes in the physical body. The reflected image has the power to change the real object, since from the image's gaze, it is possible to direct one's eyes toward oneself and reconstitute oneself in the physical space. In this sense, the mirror connects virtual and physical spaces. Eduardo Kac[16] (1993) mentions that the meaning of the word *virtual* can be traced back to optical physics. Using also the mirror as an example, the virtual becomes the place where the image is (inside) the mirror. "In Optics, 'virtual' stands for what is inside the mirror and beyond reach, while 'real' stands for that which is outside and shares our three-dimensional bodily space."

Foucault (1994, p. 366) describes several types of heterotopias. One type is capable of juxtaposing in a single real place several sites that are in themselves incompatible. Examples of such heterotopias are the theater, the cinema, and the garden.

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[14] "(…) de sortes de lieux qui sont hors de tous lieux, bien que pourtant il soient effectivement localisables".
[15] "Dan le miroir, je me vois là oú je ne sui pas, dans un espace irréel qui s'ouvre virtuellment derrière la surface, já sui là-bas, là oú je ne sui pas, (…)"
[16] KAC, Eduardo. Telepresence Art. In: Kriesche, Richard (ed.). **Teleskulptur.** Graz, Austria : Kulturdata, 1993. p. 48-72. Available at: http://www.ekac.org/Telepresence.art._94.html. Accessed on: 18 Jan. 2004.

The Persian Garden, as one of the oldest examples of heterotopias, was supposed to include the whole world in itself.

Similarly, Michel Serres (1994, p. 145) analyzes the Internet as a place of all places. The Internet is indeed a real space, but unlike the garden, its place cannot be determined. Serres affirms that actual concentrations, such as financial marketing as well as telephonic conversations among people, are virtual in a double sense. First, because they open up several possibilities that can be actualized. Second, because they occupy a non-given place. The author, therefore, connects the virtual to non-places, as opposed to the actuality of physical space. In this sense, we can consider as virtual activities all those which happen in a non-specific place, but are able to change the nearby actual context. Palen, Salzman, and Youngsten (*Apud* Rheingold, 2002, p. 27) suggest that "when mobile phone users are on the phone, they are simultaneously in two spaces: the space they physically occupy and the virtual space of the conversation (the conversational space)." As a result, Serres views the virtual as what does not exist here.

In this context, he applies the metaphor of a rich place *(riche lieu)* to the Web, as a single place that encompasses all others. This single place is oversized, equal to the planet, because it contains (virtually) everything. In this place, information, values, and data accumulate and circulate in the same single movement (Serres, 1994, p. 142). Therefore, the Web plays a double role: transportation and support. Interestingly, when William Gibson was asked in 1994 what cyberspace is, he said: "It's where the bank keeps your money." In an interview to Scott Rosenberg Gibson explains: "Cyberspace is where the market happens. It's also the place where telephone conversations occur" (In: Rosenberg, 1994).

Often cyberspace has been considered a *space of flows*. Manuel Castells (2000, p. 409) creates a dialectical opposition between the *space of flows* and the *space of places*. The last one corresponds to the spatial organization of our common experience defined by cities and urban spaces, while the first one is a concept created to label a new logic of space structured on networks and flows of information. Castells (*Ibid.,* p. 417) suggests that the *space of flows* in traditional urban spaces transforms the city from *forms* into *processes*. Therefore, mega-cities no longer happen in a place but rather are "discontinuous constellations of spatial fragments, functional pieces, and social segments" *(Ibid.,* p. 436). Felix Stalder[17] (Aug./Sep. 2001), following Castells, observes,

> The *space of flows* is a space that is organized for, and created by, the constant movement of people, goods and information over large distances. The space of flows is not so much organized to move things from one place to another, but to keep them moving around. In the *space of flows*, arrival becomes elusive, virtually indistinguishable from departure.

Castells argues that there are at least three layers that form the *space of flows*. The first one is the technological infrastructure that builds up the network and defines the new space. This infrastructure is composed of telecommunications, high-speed networks, and broadcasting systems, which form the material basis of the *space of flows*. The second layer, according to him, is composed of nodes and hubs, that is, the connecting points of the network. These nodes are places strategically located, and develop important functions that build a series of locally based activities. Finally, the third layer corresponds to the spatial organization of the dominant elites. Castells (*op. cit.,* p. 446) suggests that "elites are cosmopolitan, people are local."

If we consider metropolises like Los Angeles as representative of circulation spaces, where people generally do not walk on the streets and prefer cars and freeways to move around, it is possible to argue that urban public spaces have become increasingly non-places.[18] Although Castells affirms that the *space of flows* is not a placeless space, places have progressively lost their importance in comparison to flows. A place, according to the author, is a "locale whose form, function, and meaning are self-contained within the boundaries of physical contiguity" (Castells, *op. cit..,* p. 453). Additionally, places are not necessarily communities, although they may contribute to community building. Therefore, a place can be understood as a meaningful, interacting space. Especially after the advent of advanced transportation technologies in the 19th century, people started to circulate faster through urban spaces, losing the capacity to communicate and interact with each other while in transit.

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[17] Stalder, Felix. The space of Flows: notes on emergence, characteristics and possible impact on physical space. In: **Proceedings of the 5th international PlaNet congress.** Paris, August 26th—September 1st 2001. Available at: http://felix.openflows.org/html/space_of_flows.html. Accessed on: 21 Jun. 2003.

[18] A more detailed analysis of the city of Los Angeles as a circulation spaces can be read on chapter 5, in the work **110101110**.

With the Internet, communication places partially migrated into digital spaces. Online multiuser environments, for example, can be perceived as places in which people talk and interact with each other, even if they do not share the same contiguous physical space. In the past decade, online environments have often been regarded as ideal communication places, and some commentators predicted they would replace public spaces in the role of promoting interaction among people. Nowadays, however, it is possible to observe a tendency to bring these gathering and communication places again into physical space. Many artistic initiatives strive to transform public urban spaces by making people stop while in transit across the city, or by encouraging visitors to interact with each other in a museum space.[19]

In the first decade of the 21st century there is a movement that goes from the *space of flows* to the *space of places*. To this extent, people no longer only use urban spaces to circulate and go from place to place, but rather start enjoying going to public places as their destination. The Web moves to the physical world together with all its characteristics: connection, decentralization, speed. Why have Serres' single inflated place, if we can have the whole of physical space?

[19] Both examples will be analyzed in chapter 8.

> "During the early times of the World Wide Web it was common to read articles comparing the web surfing experience to traveling. Hopping from one web page to another, often in joyfully random manner, was hailed as something unprecedented; an almost hallucinating out-of-the-body experience." (Huhtamo, 2001/2002, p. 15)

3. MULTIUSER ENVIRONMENTS (AS VIRTUAL) SPACES

The story I am telling in this dissertation focuses on how the projection of the imagination is displaced during the passage from virtual to hybrid spaces. While virtual spaces are connected to the idea of *cyberspace* and to the *fixed Internet* as a communication technology, hybrid spaces are bonded to *mobile technology devices*, especially cell phones. Along this story, media artworks and games (and, whenever possible, the combination of both) will be used as exemplary places where people project their imaginaries, like models of creative imagination. Cyberspace has been considered an imaginary place mainly because it has been viewed as a virtual and informational place—and the concepts of *virtual* and of *information* have been developed as instances disconnected from the physical environment. Looking to the past, we can perceive that common sites of the projection of the imagination have been places outside physical known space. Therefore, the acts of traveling (moving through space) and mapping space have been critical to define the "location" of imaginary spaces. Once physical space on Earth has been completely mapped, where does the projection of imagination go? Cyberspace occupied this status during the last decade.

MUDs[1] (multiuser environments) are examples of how the imaginary has been projected in the space of the Internet. These environments have been considered places of liberty and freedom, in which users could play with the construction of space as well as

[1] There are different types of multiuser environments. We can read in the literature about MUDs, MOOs, MUSEs, MUSHes, or MUCKs, depending on what the software allows the user to do (e.g. construct objects in the world) or how users interact with each other (for socializing, or to join an adventure). In this dissertation, I will use the term MUD in a general way (specifying the type of MUD when necessary), including virtual worlds. The reason for this decision is based on the fact that a MUD (multiuser dungeon or dimension) has been the first name for this type of software in the Internet. All other types of multiuser environments are all descendants from the MUD invented by Roy Trubshaw and Richard Bartle in 1978.

with the construction of the self. This chapter focuses on the interconnection between multiuser environments, virtual spaces, and imaginary places.

MUDs are like games, but they are special types of games which are open-ended and which can be mixed with “real” life. The most common question behind MUDs has always been “what are the borders between one’s ‘real life’ and one’s ‘virtual life?’” The second part of this dissertation investigates what happens to imaginary places once these games and digital artworks are brought into physical space by means of nomadic technology devices.

As we have seen, one of the critical issues regarding virtual reality has been related to finding out the boundaries between real and imaginary. Computer-generated virtual reality systems invert the Platonic logic, since they create a representation of reality that is meant to be better, or more perfect, than the real. Moreover, VR systems simulate reality, which means that they can, but are not supposed to, mirror the physical world. This belief nourished art and science fiction during the last two decades, always pointing to the dangers of mixing virtual and physical spaces, real and imaginary. For Plato, a copy could not be mixed with its original, since the copy was no more than a shadow, an image that could be similar to, but was in no case the perfect real. We have seen that Plato considered the theater, or the game, also as a copy. Theater, paintings, and other types of “art” were defined by the philosopher as copies of copies. Consequently, they were merely unreal representations of life.

Multiuser environments are also games. Although they lack the features of scoring points and having a winner, the user is supposed to create an online character to represent herself in the digital world. Unlike Plato’s game, however, multiuser environments are virtual games, that is, they are not supposed to represent life, but to simulate it. Therefore, the boundary between the game and real life has always been an important issue in studies about these environments. Are players just acting out or are they in the virtual world as themselves? How much of oneself is put into one’s character? Is it possible to create multiple selves in virtual worlds? What is in fact the self? Does the player separate the time she is playing from the time she is not playing, or is real life just one more window on the computer screen? What is the best environment, the MUD or real life?

In addition to these questions, the tension between physical and virtual has been a determining factor for the development of the concept of *MUDs as multiuser environments*. MUDs are part of cyberspace. For this reason they have been regarded as immaterial and fluid spaces. In this sense, not only the space can be built and rebuilt according to users' imaginations, but also everyone's characters (or avatars) could be described without the constraints of a material body. Consequently, MUDs have been considered places where people could project their imaginaries and feel free from the physical world.

In chapter 9, we will see that the act of bringing these multiuser games to the physical domain replaces the only feature in which MUDs differed from "the game of life": the necessity of choosing an avatar. In a MUD, the user is prompted to create an avatar to represent herself on the other side of the screen because she cannot physically be there. With location-based mobile games, however, the player becomes her own avatar. This situation has been foreseen in movies like **The Matrix**, as we have seen in the last chapter. Nevertheless, in **The Matrix** the distinction between virtual and physical is still critical for the development of the movie. The Matrix's software is indeed like cyberspace: Once one *knows* it is an immaterial space, one can do whatever she wants, even challenge the laws of gravity, for the software is inside our minds. Mobile technology devices bring the game into the physical space, transforming city spaces into the game's map. After the emergence of wirelessness, ubiquity, wearability, and mobility, we are compelled to ask, what was in fact the advantage of having an immaterial body?

The first part of this chapter is dedicated to the history of MUDs inside a history of the Internet as a social place. The second part presents MUDs as imaginary places. In this context, two topics are important: a historical overview of imaginary spaces, and the utopia of considering MUDs as places of liberty. Finally, we analyze multiuser environments as (virtual) spaces, considering the immaterial body, the virtual city, and the spatial labyrinthine characteristics of these environments. This last part is connected to the (frustrating) attempt to map virtual spaces with graphic interfaces.

3.1. The Internet as a sociability place

In "Cyberspace: first steps," Michael Benedikt (2000, p. 31) defines cyberspace by means of four distinct but connected trends. First, he views cyberspace as *language*. He connects this first trend to MUDs, since these types of virtual worlds are basically enacted by means of words. The second trend refers to cyberspace as a *communication space*. This trend includes the Internet in the history of telecommunication media, like the telephone and, more recently, the cell phone. The third trend connects cyberspace to *architecture*. However, as he considers cyberspace an immaterial place, *architecture* acquires a different meaning, referring to the fluid forms that are possible to imagine in this virtual space. Finally, the last trend connects cyberspace to *mathematics*.

At this point, we are mainly interested in the first three trends. While the first and the third trends are linked to the idea of cyberspace as an immaterial place, the second trend is the one which is going to lead us to the connection to mobile technology devices. Interestingly, during the last two decades most studies about the Internet focused almost exclusively on the first and third trends: cyberspace as language and cyberspace as an immaterial place. Today, however, there is a shift in this trend, where the Internet is included in the history of telecommunications. Our perspective does not consider the Internet as a standalone entity that creates a new space for communication, completely disconnected from physical space; rather, it is part of social interactions in physical space. Benedikt (*op. cit.,* p. 38), as many other writers, considered cyberspace as a libertarian and non-material space. In this sense cyberspace became a place for the imagination, for *any kind* of space could be constructed within its domain.

MUDs are gathering places inside the Internet and do not depend on geographical locations. Multiuser environments became popular for allowing many people to connect to the same place at the same time. Certainly multiple people are able to access the same Web site simultaneously, but a multiuser environment is defined when these people have the awareness of each other's presence, and the ability to have synchronous communication. Therefore issues about *presence*, *activity*, and *identity* have been critical to studies on these places during the last decade.[2]

[2] See Turkle,1995; Murray,1997; Rheingold, 2000; Donath,1997.

MUDs are virtual spaces with textual, 2-D graphic, or 3D graphic interfaces in which users (inhabitants) choose avatars (the body representation in virtual world) in order to interact with other people. Users are sometimes also able to build the environment, usually a (literal) representation of the physical world. In this context, multiuser environments can be perceived as places in which people talk and interact with each other, even if they do not share the same contiguous physical space. In summary, MUDs are (1) social places (spaces used for communication), (2) places that allow communication among people who are not in the same physical place, (3) places which allow people to meet in virtual spaces, and (4) places that let people inhabit the same (virtual) space even if they are not actually talking to each other.

According to Smith and Kollock's definition, (1999, p. 7) "MUDs are text-based virtual realities that maintain a sense of space by linking different 'rooms' together." Since the 1970s the Internet has developed as a "virtual"[3] sociability space, that is, a non-place that allowed people to meet each other with no need to share the same physical space. The telephone had already supplied this need, but the Internet opened the possibility of asynchronous communication via e-mails and bulletin boards. The Internet also allowed many people to connect and gather in the same place at the same time. Once again, the telephone already allowed conference calls; however, multiuser environments mixed games and virtual spaces, letting users play with identities and characters in "cyberspace."

The first recorded description of social interactions that could be enabled through networking was a series of memos written by J.C.R. Licklider[4] from MIT in August 1962 discussing his *galactic network* concept. He envisioned a globally interconnected set of computers through which everyone could quickly access data and programs from any site. In spirit, the concept was very much like the Internet of today. Licklider[5] was the first head of the computer research program at DARPA,[6] starting in October 1962. While

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[3] It is interesting to perceive that the concept of virtual applied to the Internet has often been used to describe a non-place, a space of flows, or a simulation space. Yet it has never represented the potentiality included in it. For a more detailed explanation on virtual as potential, see chapter 2.
[4] Licklider, J.C.R. & Clark, W. On-Line Man Computer Communication. August 1962.
[5] *Id.*
[6] The Advanced Research Projects Agency (ARPA) changed its name to Defense Advanced Research Projects Agency (DARPA) in 1971, then back to ARPA in 1993, and back to DARPA in 1996. We refer throughout to DARPA, the current name.

at DARPA, he convinced his successors Ivan Sutherland, Bob Taylor, and Lawrence G. Roberts of the importance of this networking concept. Around the same period, in Jul. 1961, Leonard Kleinrock[7] published the first paper on packet switching theory. Due to Kleinrock's early development of packet switching theory, his Network Measurement Center at UCLA was selected to be the first node on the ARPANET. In the beginning of the 1970s, the Internet emerged with the goal of sharing information via remote computers. The Stanford Research Institute (SRI) provided a second node. Then two more nodes were added at UC Santa Barbara and the University of Utah, making a total of fours nodes that formed the first ARPANET network.[8]

Until 1972 the computer network was restricted to universities and mostly used for remote access. The critical change came with the invention of e-mail, which transformed the network into a communication medium, connecting not only computers, but also people. E-mail, developed by Ray Tomlinson in 1971, can be regarded as the first social medium of the Internet. It allowed users to post mail messages across a network to individual accounts. As early as 1972, e-mail was one of the two most widely used applications on the network (the other was still remote log-in services). Moreover, the emergence of mailing lists, listservers, and bulletin boards allowed several people to read the same messages, creating a new space for communication and sociability. Mailing lists are one-to-many communication systems, in which only one person can post messages to the subscribers in a list. Listservers allow many-to-many discussions by permitting all subscribers to post messages to the list. The further development of mailing lists and list servers led to Bulletin Board Systems (BBS). BBSs simulate a virtual board where messages are "attached," and the discussion can be followed starting from any of the previously posted messages. Messages are posted to a central site, now usually Web-based, to which users must go to in order to check them.

The emergence of technologies allowing online communication created a new social virtual space, about which many people were enthusiastic, for they "abolished" geographical distances, connecting people with common interests. The next chapter in this history is the appearance of online chats and then multiuser environments. We can

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[7] Kleinrock, Leonard. Information Flow in Large Communication Nets. **RLE Quarterly Progress Report**. Jul. 1961.

[8] Font: Internet Society (Isoc). Available at: http://www.isoc.org/. Accessed on: 17 Dec. 2003.

point out two evolution lines for virtual multiuser environments. On one side, MUDs are descendants of the development of the Internet as a communication media, which began with e-mail, listservers, and Bulletin Board Systems. This evolutionary line defines MUDs as a synchronous communication space, which happens in real-time. E-mails and BBS allow asynchronous communication and therefore do not provide users with the feeling that they occupy the *same place simultaneously*. Yet in MUDs it is possible to share this place and perceive the presence of others online. On the other side, as argues Julian Dibbell (1998), MUDs are descendants from maps. This line is connected to the history of gaming, which defines games as imaginary worlds that can be constructed and inhabited. Today MUDs are basically divided into adventure and social environments.

The very first MUD was written in the fall of 1978 by Roy Trubshaw, a student at Essex University in England, in MACRO-10 (the machine code for DECsystem-10), and then later converted to BCPL. The game was originally little more than a series of interconnected locations where one could move and chat. Richard Bartle[9] (1999), who co-authored the MUD with Trubshaw, points out how primitive the software was at that time:

> There was no objective for the players, and only primitive communication. There was no point-scoring system, there were no mobiles, no containers, and even some of the infrastructure was missing (e.g. two people in a dark room, one with a torch: the other still couldn't see).

Bartle tells that Trubshaw had mainly two reasons to write this system. First he wanted to make a multiplayer adventure game. Second he was willing to write an interpreter for a database definition language. In this sense, the Internet was the perfect place to create such a type of environment. As Janet Murray (1997, p. 71) suggested, digital environments have four main characteristics. They are *procedural*, *participatory*, *spatial* and *encyclopedic*. MUDs fulfill almost all of them. They are procedural because MUDs are essentially computer programs, composed of a database of objects and instructions. According to Murray *(Ibid.,* p. 152),

> procedural authorship means writing the rules by which the text appears as well as writing the text themselves. It means writing the rules for the interactor's involvement, that is, the conditions under which things will happen in response to the participant's actions.

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[9] Bartle, Richard. **Early MUD history.** 21 Jan. 1999. Available at: http://www.mud.co.uk/richard/mudhist.htm. Accessed on: 16 aug. 2003.

They are participatory because the user is compelled to interact with the environment as well as with other users. They are spatial because the user has the ability to give commands and to change the space in which she is immersed. Finally, they are encyclopedic because they are formed by a huge database of information,[10] which can be accessed in different ways.

Lastly, Trubshaw's first reason for creating a MUD was an attempt to insert traditional role-playing games in the digital space. RPGs emerged in the 1970s and stand for multiplayer games in which each player chooses an identity and engages in a story, generally connected to medieval metaphors. These types of games are open-ended, that is, they can last for years and the primary goal is no longer winning, but cooperation among players.

Julian Dibbell (1998, p. 52) connects the origins of MUDs to the development of cartography. He suggests that when somebody sees a map, one is induced to inhabit that map, to envision oneself inside the tiny represented space of a specific territory. Nevertheless, whereas maps invite interaction and immersion, they frustrate it too, since it is not possible to penetrate the map. This thought has obvious connections to the idea of the 1:1 map developed by Lewis Carroll, Jorge Luis Borges, Umberto Eco, and Jean Baudrillard, mentioned in the last chapter. The wish to build a map, which was the size of the territory, was an attempt to build such a perfect representation that it would be mixed with the territory itself. Therefore, inhabiting the territory would mean the same as inhabiting the map. However, as all of them demonstrated, such a map also destroys the territory and that is why Dibbell argues that the attempt to inhabit a representation is also frustrating. Representations are not meant to be immersive environments. Simulations play this role better.

Interestingly, the author indicates the development of the first board games right after the emergence of the earliest maps. Board games solved the problem of interaction with the represented space by creating game pieces that were supposed to represent the player on the board. Therefore, we can perceive that the idea of representing the subject in another space is much older than the Internet.

[10] The database, in this case, is the virtual world itself.

With the centuries, these games acquired complexity. The ancient racing games evolved into games of battle like **Checkers** and **Chess**, and much later into economic contests like **Monopoly**. The arrival of **Chess** in India around the sixth century, and the later development of the East Asian game of **Go** required a high level of tactics and strategies. A common characteristic in all of them was the ability to simulate real world actions in the realm of the imaginary. As Dibbell (*Ibid.,* p. 53) points out, "the tension between reality and unreality was always the source of the board-gamer's delight."

This scenario did not change much until the post-war period in the middle of the 20th century. By this time, influenced by World War II, the complexity of games increased, including more details and simulating stories connected to war environments. These games, modeled after famous battles, such as Waterloo or Stalingrad, could take hours, days, or even weeks. The significant change, however, occurred in 1973 when two veteran wargamers, Gary Gygax and Dave Anerson invented a new type of game called **Dungeons and Dragons (D&D). D&D** differed from past games mainly by the fact that there was no direct competition among players. Of course players could still kill each other, but according to the game design, it was much more interesting to cooperate with other participants in search of some major adventure. Therefore, the goal of the game was no longer winning, but just playing.

Each participant was supposed to choose a character and, even though this character could eventually die, it was no big deal to create another one and to keep on playing. **Dungeons and Dragons** evolved to a broader category called *role-playing games*, which could, in theory, last years. According to Dibbell (*Ibid.,* p. 55), **D&D** combined the interactive structure of board games with the psychological density of fiction narratives, but with an open-ended story. Narratives and maps have more in common than is commonly believed. Mary Fuller and Henry Jenkins (1995, p. 68) in an article about the computer system **Nintendo®** point out that early maps were not merely representations of the territory; they also included the travel routes, and the marking out of itineraries with the stops that the traveler was supposed to make (cities in which the traveler should spend the night and/or pray). The authors suggest that these maps (just like contemporary games) "focused on the specific narrative actions to be performed upon these spaces, purposes to be pursued and sites to be visited"*(Id.).* Therefore, we can infer that maps have already been narrative spaces in their early days, losing this feature along the centuries. In this sense, **D&D** really inherited from maps the feature to penetrate the territory and to construct a narrative upon this territory.

Still according to Dibbell (*op. cit.,* p. 55), **D&D** could manage the old wish to penetrate the map, by paradoxically taking the map out of the game. In fact, RPG players never have access to the game map. They are able to access the description of nearby places, but the entire map is always folded, waiting to be explored. **D&D** territory is like a labyrinth shaped inside the players' imagination. Moreover, eliminating the game pieces, the player was forced to place herself psychologically inside the game, eliciting the desirable immersive feeling. As a result, **D&D** players were not only represented in the game, they were identified with their characters.

With the emergence of personal computers, it was not hard to perceive that the narrative quality of PCs was extremely suitable for the development of such games, as Janet Murray pointed out (1997, p. 213). Almost concomitant with the conception of **Dungeon and Dragons,** William Crowther, a cave explorer and programmer, created what is considered the first computer adventure game: **Adventure**. At that time, Crowther was involved with **D&D,** and also actively exploring and mapping portions of the Mammoth and Flint Ridge cave systems in Kentucky. After a while, he decided to create a game, which would be his imaginary re-creation of the caves, and would also be a game for his children. Crowther explained:

> My idea was that it would be a computer game that would not be intimidating to non-computer people, and that was one of the reasons why I made it so that the player directs the game with natural language input, instead of more standardized commands.[11]

Later, in 1976, the program was greatly expanded by Don Woods, from the Stanford Artificial Intelligence Lab at Stanford University. Influenced by narratives like "The Lord of the Rings," very popular at that time, Woods added more fantasy-like features, such as trolls and elves. Besides many of the features of the **D&D** game, he also included an interesting innovation: the dungeon master, the person who sets up and runs a **D&D** world, was now played by the **Adventure** computer program itself.[12]

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[11] Adams, Rick. **The colossal cave adventure page** (A history of "Adventure"). Available at: http://www.rickadams.org/adventure/a_history.html. Accessed on: 16 aug. 2003.
[12] **Adventure** can be played online until today at: http://www.wurb.com/if/game/game/1.

Inspired by **Adventure**, Dave Lebling, Marc Blank, Tim Anderson, and Bruce Daniels, a group of students at MIT, wrote a game called **Zork** in the summer of 1977. Although **Zork** did not borrow any code from **Adventure**, it was built based on the same maze-like concepts. Nonetheless, like **Adventure**, **Zork** was still a single-player game. With the development of the Internet and the possibility to connect computers all over the world, the next step was to make adventure games similar the original **D&D**, adding the multiuser feature. The name Multi-User Dungeon (or Dimension), usually just called **MUD**, was chosen partly as a tribute to the Dungeon variant of **Zork**, which Roy Trubshaw had greatly enjoyed playing. Later, Trubshaw handed over the development of **MUD** to Richard Bartle, also a student at Essex University in England. The original MUD was available on the UK CompuNet network for two years until the DECsystem-10 computers were decommissioned.[13]

The earliest MUDs were basically adventure games where players were supposed to get together in order to join some mission, like killing a dragon, or meeting a wizard. Furthermore, although this was not the goal of the game, one's character could eventually die if the player did not "take care" of it. Characters on adventure MUDs starve, and need to sleep and drink.

Almost 20 years after the invention of the first **MUD**, in August 1989, Jim Aspnes, a graduate student at Carnegie Mellon University wrote in one weekend what he called the **TinyMUD**. **TinyMUD** was similar to traditional MUDs as far as the multiplayer and open-ended features. However, it was basically a social environment, to which players would connect in order to meet other people and chat, instead of killing dragons and monsters. **TinyMUDs** focused less on combat, and more on problem solving, user cooperation, and social interaction among the **MUD** visitors. Also, they abolished the wizard system and hierarchical medieval models. The focus on sociability, together with the fact that **TinyMUD** ran on a wide variety of Unix systems, helped fuel the popularity and growth of MUDs around the world.

This type of game turned to be called *Social MUDs*, contrasting with *Adventure MUDs*. With the intention of having an endless "game," Aspnes then removed the

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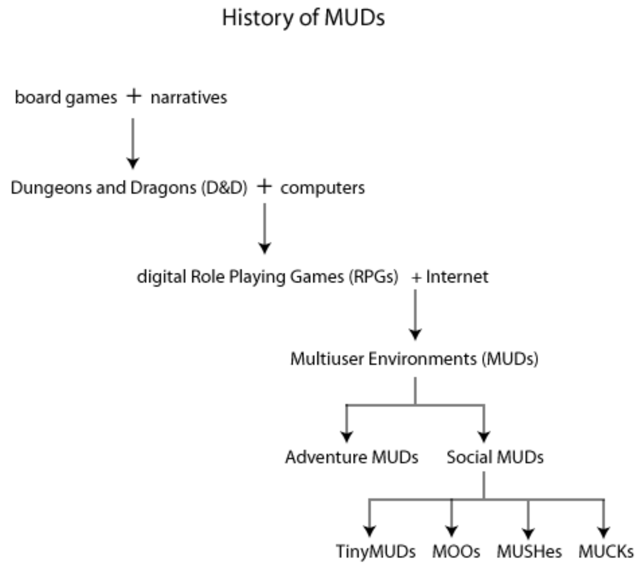
[13] It is still possible to play the original version at http://www.british-legends.com, a Web version converted by Viktor Toth from BCPL into C/C++.

conventional framework of player rankings and fixed goals to be accomplished out of his MUDs. “The truth was, **TinyMud** really had no structure at all—it was literally whatever its players wanted it to be,” considers Dibbell (*op. cit,.* p. 60). After the first Social MUD, other types of MUDs have been created. The names MOO, MUSH, MUSE, or MUCK are essentially social multiuser environments, but differ in some permissions on how the users can interact with the software and with each other. For example, the concept of a MOO was introduced by Pavel Curtis in 1996, creating the model of a configurable MUD with a built-in object-oriented language. MOO stands for MUD, Object Oriented, and its most famous representative is **LambdaMOO**.

Social MUDs have become very popular, acquiring relevance in the development of social activities. Elizabeth Reid (In: Smith; Kollock, 1999, p. 125) mentions a survey that took place in **LambdaMOO**, in which 583 users were asked to nominate the activity that took up most of their time in the MUD. A majority (57.26%) responded that socializing was the most time-consuming activity, 14.63% said exploring, 14.14% said building took up most of the time, and finally 6.99% said competitive gaming and puzzle solving.

Considering the history of MUDs inside the history of the Internet, there has been a development from asynchronous message exchanging (with e-mails, bulletin boards and e-groups), to synchronous message exchanging (with chats), to role-playing message exchanging (MUDs). Similarly, following the evolution of games, there is an increase in the complexity of board games to include tactics and narrative. Then the time dedicated to gaming expanded from hours to weeks, then years, and then to the possibility of endless games. This last possibility also included role-playing. Consequently, we observe from both sides a crescent overlap between game and life. When the time spent on gaming is comparable to the time spent not gaming, which one is more important and, mostly, why do we have to make the distinction?

Below is a summary of the history that has just been told:



3.2. MUDs as imaginary spaces

Social MUDs are descended from games, but in order to call them games, we should reconsider the definition of the word *game*. People do not really come to social MUDs to play games. They came to socialize, to build places, and to construct identities. Also there is no such a thing as the Platonic definition of a game as an unreal act that is disconnected from real life and unmasks reality. Surely social MUD "players" (or better, inhabitants) can be acting out and constructing new identities, but we cannot be sure about that. Therefore, the question "what is the border between the game (as a ludic representation of life) and the serious life?" has never been so important, exactly because there are no fixed borders. In this sense, it would be more suitable to propose a definition of game closer to the one suggested by Eugen Fink (1966, p. 80-81): a game that mixes with life, and that *is* the life itself. From this perspective, there is no longer a reason to inquire whether characters in social MUDs are really themselves or whether they are playing with their imaginaries.

Nevertheless, the definition of borders between reality and imagination in MUDs has been an important topic of discussion. Especially because MUDs are played in the Internet (for many, cyberspace) the separation between physical and virtual, also understood as the separation between real and imaginary, was critical to define the user's behavior in these environments. For example, one of Sherry Turkle's MUD players asked, "why grant such superior status to the self that has the body when the selves that don't have bodies are able to have different kinds of experiences?" (Turkle, 1995, p. 14).

Cyberspace has been considered a place of liberty mainly due to its definition as immaterial and virtual, concepts related to freedom from the constraints of physical space. Multiuser environments, as an important part of cyberspace, have been regarded as the ultimate places in which users could exert their liberty, since it was possible to "play" with the construction of space and with the construction of identities.

MUDs have been considered ideal societies: places where there were no racial prejudices and no gender differences, and where one could practice safe sex. Margareth Wertheim (1999, p. 268) also views cyberspace as a new space for the "spirit." With the present dreams of cyber-immortality and cyber-resurrection, she argues that we have in technology the re-emergence of something really similar to the medieval Christian soul. Wertheim suggests that cyberspace is different from physical space because it is not subject to the laws of physics. "No matter how many dimensions hyperspace physicists add into their equations, cyberspace will remain 'outside' them all. With cyberspace, we have discovered a 'place' beyond *hyperspace*" (*Ibid.,* p. 228). With this argument, as we saw in the first chapter, she emphasizes the disconnection between physical and virtual. In addition, she compares cyberspace to the medieval soul-space. Like with cyberspace, in the Middle Ages there was also a non-physical space, which existed parallel to the material world, but was not "contained" in it. The medieval spiritual space was a unique part of reality separated from physical space.

This projection of imaginary selves and spaces generally happens because we have never been resigned by fate to inhabit just one type of space, and we have frequently dreamed about places of body and soul liberty. In the 1980s/1990s, this projection of liberty spaces has been transferred to digital space, an immaterial space far away from the physical world's laws and constraints. Since the idea of *cyberspace* emerged, this digital environment has been considered a site where one could assume multiple identities and construct new and imaginary places.

3.2.1. The construction of imaginary spaces

The projection of imaginary (inner) spaces onto external reality is as old as the human race. Throughout history these projections of possible realities have been redefined many times. Although there are numerous sources of imagined realities, generally they have been connected to one idea: the existence of unknown and distant realities. Whereas in former times imaginary spaces were located *outside* known and familiar space, they now move *deeper into* known space, which contains within itself the invisible nanoworld, as well as enfolded realities.

In order to better understand why imaginary spaces inhabited cyberspace, and today inhabit the known space, it is helpful to briefly map the successive displacements of the imaginary from the physical to the digital and then to the nanoworld. Since ancient times, the imaginary has been connected to the unknown and projected outside of the explored physical space. For example, natural phenomena have had unknown causes. Therefore, the ancient Greeks created a god for each natural phenomenon (the sun, thunder) and placed them on a distant mountain, Mount Olympus. According to Daniel Boorstin (1989, p. 88), all high mountains have always been idolatrized by peoples who lived nearby. The Greeks were sure that Olympus was the highest mountain in the world, but every people worshiped their own high mountain: Meru mountain for the Indians, Fujiyama for the Japanese. Civilizations even imagined and constructed artificial mountains in order to achieve unknown territories, like the Tower of Babel and the Egyptian Pyramids. According to him, “the Babel tower became a symbol of human effort to achieve Heaven and to invade the gods’ territory” *(Ibid.*, p. 89). These “mountains” were so special because they represented an unexplored territory, and were therefore not part of the known physical space. In addition to mountains, which could be considered “extremely high” geographical accidents within the known space, heaven and hell have also been included in the category of imaginary spaces mainly from the Middle Ages on, as we saw in chapter 1. The description of these imaginary spaces has been strictly related to the known physical space at that time. Dante’s hell, for example, was richly described with rivers, valleys, and fires. Boorstin (*Ibid.,* p. 94) points out that life in the subterranean world was simply an extension of life on Earth, and that is why in many cultures the warrior was engraved with his wagon, his horses, his weapons, and his women. Inside this context, Italo Calvino (1974, p. 140) makes a point about mirrored cities, such as physical cities reflected in the world of the dead:

> Like Laudomia, every city has at its side another city whose inhabitants are called by the same names: it is the Laudomia of the dead, the cemetery. But Laudomia's special faculty is that of being not only double, but triple; it comprehends, in short, a third Laudomia, the city of the unborn.

These reflected cities, among others, are the ones that allow Marco Polo to imagine and narrate about possible, or virtual places. Moreover, he relates the description of the cities of the unborn with cities that could have been and were not. In "cities & the dead 3" Calvino refers to the same metaphor to tell about Eusapia, a city in which its inhabitants have constructed an identical copy of their city underground, creating a Eusapia of the dead. As time passes, the dead Eusapia turns out to be more like a city than its original, and the Eusapia of the living starts to copy its underground copy. In the end, the dead people rebuild the upper Eusapia according to the image of their city. Ultimately, the Eusapia of the dead represents a story about a city that has become a hyperreality, for it has become better, or more perfect than its original. In addition, Marco Polo points out the fact that there was no longer any distinction between the alive and the dead, or between the original and its copy. In the end, we find out that **Invisible Cities** is a narrative about the virtual: Marco Polo uses his ability as a travel narrator to tell Kublai Khan about places he had supposedly visited. Yet it makes no difference if the cities are real or only a product of Polo's imaginary. Moreover, it turns out that all narratives are about the same city, Venice. They are not the actual Venice, but possible, potential cities that could have existed or are yet to exist. Calvino then combines travel, imagination, virtuality, and unknown spaces in one single narrative.

During the Middle Ages, much of the popular imaginary was based on travelers' tales. Travelers went to distant and unknown places, which generally had no precise geographical position, and then returned to narrate their experiences. These places became sources for the imaginary when located outside the "known world," that is, the borders of the Mediterranean. Therefore the construction of imaginary spaces has always had a close connection to the definition of borders, that is, to what is inside or outside the known space. Here the definition of space takes on a slightly different meaning than the one proposed by Castells.[14] Space, according to Michel De Certeau (*Apud* Fuller; Jenkins, 1995, p. 66), is a place in which a narrative has been embedded. "Places exist only in the abstract, as potential sites for narrative action, as locations that have not yet been colonized." Once places get in touch with narrative agents they become spaces. The medieval man used to construct narratives about distant places in order to include them into their imaginary spaces. Traveler's tales had the duty to transform unfamiliar places into familiar spaces. Stories, he argues, are centrally concerned with "the relationship between the frontier, and the bridge, that is, between a (legitimate) space and its (alien) exteriority" (*Ibid.,* p. 67). Castells (2000, p. 441) substitutes the concept of *narrative* with the one of *social practices*. Once a space becomes familiar, it can become the stage for social practices. In this sense, places constitute a "stability" which must be disrupted in order for stories to unfold. Places are there but do not yet matter. The new world, before the European discovery, is an example of place for Certeau. The lands existed, were geographically present, and culturally functioning for a long time, but they just became spaces after the European ambitions and narratives. "Spaces, on the other hand, are places that have been acted upon, explored, colonized. Spaces become the location of narrative events" (De Certeau, *Apud* Fuller; Jenkins, *op. cit.,* p. 66).

According to Lorraine Daston and Katharine Park (1998, p. 60), medieval books of topography and travel "enlarged their reader's sense of possibility, allowing them to fantasize about alternative worlds of barely imaginable wealth, flexible gender roles, fabulous strangeness and beauty." We can perceive here also a correlation with the Leibnizian concept of virtual, for imaginary places have been constructed as possible spaces with no specific geographical position. These spaces could be anywhere *outside* the physical known space, and could contain any type of imaginable creatures. The world was created in the readers' minds.

Travelers' tales were considered valuable not because they were accepted as literally true but because they stimulated the imagination. Italo Calvino starts the narrative of **Invisible Cities** as follows:

[14] For Castells, as we have seen in chapter 2, a place is inhabited by people and defined by a special geographical position. "A place is a locale whose form, function, and meaning are self-contained within the boundaries of physical contiguity" (Castells, 2000, p. 453). On the other hand, he also defines space in a more abstract way as "the material support of time-sharing social practices" (*Ibid.,* p. 441).

> Kublai Khan does not necessarily believe everything Marco Polo says when he describes the cities visited on his expeditions, but the emperor of the Tartars does continue listening to the young Venetian with greater attention and curiosity than he shows any other messenger or explorer of his. (*Id*., p. 5)

Because Polo represented the outsider, the one who came from a distant and unknown land, the veracity of his narratives was irrelevant as long as it could nourish the Great Khan's imagination. They achieved reality through affirmation. Such imaginary places, constructed through the mediation of travelers' tales, can thus be considered mediated spaces. Imaginary spaces are frequently created when one is not able to physically access them. Mediating interfaces, standing at the borders between the real and the imaginary, are critical to building these imagined spaces.

Outer spaces could be weird, but even weirder were the creatures imagined to inhabit these places. Monsters and beasts of every kind inhabited the outer territory.

> And here be also of other beasts as great or more greater than is a destrier, and men yclept them "loeranez" and some yclept them "odenthos." And they have a black head and three long horns trenchant in the front, sharp as a sword and the body is slender; and he is a full felonous beast, and he chaseth and slayeth the "oliphant." (Newton, 1926, p. 161)

This passage from **Mandeville's Travels** shows that these beasts were regarded with curiosity and sometimes fear, but were generally considered "positive" marvels. However, when they were brought inside the borders of the known space, these creatures were not so positive. Daston and Park (1998, p. 50) distinguish between monstrous individuals and wonderful species. Both are qualified as wonders because of their rarity, but the last ones were viewed with curiosity, while the former ones required immediate decisions, for they affected the life of people living in a known world, inside its borders. Moreover, monstrous creatures were generally regarded as miracles or bad presages. In this group were all types of humans and animals, deformed due to unknown causes, but who were born inside a known space. That is why they were normally considered "negative." Monstrous individuals were described a hybrid of humans and animals that did not represent a race, unlike the centaurs, for example. They were children born with two heads, or Siamese twins. Generally wonders lived beyond the margins of the Mediterranean. However, the belief in miracles, prodigies, presages, and other forms of divine communication suddenly created irruptions of the marvelous into the course of everyday life. Therefore, the Christian medieval world attempted to bring the imaginary spaces into the domain of the known physical space. Myth and marvels were no longer confined to a distant land. However, they were definitely not part of the normal order of the world.

On the other hand, among the human monstrosities which lived outside the margins of the Mediterranean, in remote sites of the Earth, there were tribes with eight-foot feet turned in opposite directions, men with dog heads and claws instead of fingers, who barked instead of speaking, and people with just one leg. These hybrid races were a source of curiosity and surprise, instead of fear. They populated travelers' tales and were regarded as a necessary part of unexplored places.

In a sum, the medieval man regarded the Mediterranean area as the center and everything else as the border. The borders were inhabited by weird beasts and wonders, which nourished the emergence of new and possible realities. Medieval maps generally included heaven and purgatory, and this last one was located in a mountain somewhere in the southern hemisphere. Not only distant spaces were imagined outside the borders of the known space, but also the Earth itself was a source for projection of the imagination. For many centuries, parts of the Earth's surface were still unexplored, therefore opening space for imagination. Boorstin (1989, p. 97) tells that long before the Greeks believed in a spherical Earth they discussed a lot about its shape. Homer considered the Earth as a circular disc surrounded by the river ocean. Yet Herodotus supported that there was no river, but a desert. Other speculations about the Earth go further. A Hindu picture shows our planet as a semi-sphere sustained by four elephants standing on a giant turtle that floats on the waters of the world. Centuries later, Christian Europe forgot about the Greek knowledge and imagined again a flat Earth, like an "O" divided by a river in a "T" shape. Above it there was Asia. Europe was placed on the left-hand side, while Africa was on the right. The best known representation of this view of the world is the Hereford Map, showed in the picture below. It is worthwhile to notice the strip of land in the far right, which includes some marvelous and exotic creatures, such as the elephant (with a castle on its back), the parrot, the camel, the crocodile, the unicorn, and the dragon.

Picture 12: The Hereford map.

As the globe has been increasingly mapped, imaginary spaces have been successively relocated. Science fiction narratives illustrate how imaginary spaces moved from the Earth to outer space. The work of writer Edgar Rice Burroughs, creator of

Tarzan, exemplifies this trend. The Tarzan novels were conceivable at the beginning of the twentieth century because Africa was still not completely explored by Europeans. Because it was unknown, it served as a space for the projection of the imagination. But once Africa had been completely mapped, Burroughs stopped the Tarzan series and started writing about the planet Venus as an imaginary space. By the twenty-first century almost all planets of the solar system have been explored, and we are fairly sure there is no life close to us (with the possible exception of Europa). So where do imaginary spaces open up today?

During the last twenty years cyberspace has frequently been regarded as the place where the projection of imagination could occur. The digital space represented a place located outside the borders of physical space. The idea of immateriality was critical to define cyberspace as a place for the imaginary. Because it has been considered immaterial, it would be free from the constraints of the physical world. Therefore, it would be possible to create new places and new identities. It would be feasible to lose one's material body and still travel around the world as a body of information. In contrast to the Deleuzian idea of the virtual as potential, in the rhetoric of cyberspace the virtual has often been regarded as simulation: immaterial, non-physical, and non-real rather than as emergent potentiality. Several science fiction works in the past two decades have helped to project the imagination into cyberspace. William Gibson's trilogy, including **Neuromancer** (1985), **Count Zero** (1986), and **Mona Lisa Overdrive** (1988) made cyberspace a household name. Neal Stephenson's **Snow Crash** (1992) also helped to popularize the idea of virtual spaces.

Due to the increasing number of Web sites and cyberspace's commercialization, the desire for freedom does not quite fit what the Internet has become today. It has been possible to actualize imagined spaces when constructing virtual worlds, but until recently they could not be connected to the physical world in meaningful and flexible ways.

Nowadays, we perceive a migration of places of the imaginary from cyberspace either to the extraordinary big or to the infinitely small. Examples of the first trend are novels that take place in other galaxies, such as **Star Wars** and **Star Trek**. In the second possibility, we can observe several science fiction novels about nanotechnology, such as Neal Stephenson's **The Diamond Age** (1995). Nanotechnology has in part become the "unknown" space, which is there yet to be explored. It represents an instance that, although inside physical space, is a fold of the known space which cannot be viewed, only sensed.[15] The other part of this projection of imagination into folded spaces within the known space is produced by the use of nomadic technology devices, as we are going to observe in the second part of this dissertation, mainly in chapters 7 and 9.

3.2.2. The utopia of MUDs as libertarian places

"The failure of the ideal of complete freedom in cyberspace was an early phenomenon," suggests Elizabeth Reid. (Reid, 1999, p. 107). The author tells that as early as the mid-1970s restriction rules were imposed by the system's administrator to the CommuniTree Bulletin Board because a group of adolescents connected to the system posted obscene messages to the board.

Parallel to the liberty places imagined by societies, there have always been places that have constraints that could justify the existence of the former ones. In the Middle Ages, hell and purgatory restricted people's actions in Earth. As we saw in chapter 1, during the Renaissance and the Classical Ages, the perspectivist painting through which the world was represented framed the landscape. In modern times, simultaneous with the emergence of theories about hyperspace, living in three dimensions has already been regarded as a limit. In the last decade we frequently heard that cyberspace was the ultimate representation of an unlimited space.

Kevin Robins contradicts this utopian position, paraphrasing William Gibson and writing that all discussion about cyberspace as a libertarian place and dematerialized space is actually a "consensual hallucination" (Robins, 2000, p. 77). Robins criticizes the common sense position from which cyberspace is imagined as a zone of unlimited freedom, "a grid reference for free experimentation, an atmosphere in which there are no barriers, no restrictions on how far it is possible to go" (Plant *apud* Robins, 2000, p. 82).

Even representing the projection of this freedom space so desired throughout western history, the Internet did not quite correspond to this utopia of liberty. Like every space, the digital has limits, and the limitations direct our ways of interacting with it.

[15] More about nanotechnology as an imaginary space can be read in chapter 8.

According to Lawrence Lessig, if laws are what limit us in the physical world, in cyberspace the code is the law (Lessig, 1999). Professor John Maeda, from the Aesthetics and Computational Group at the MIT Media Lab, affirms that designers are wrong when they think that they can do whatever they want with available graphic software, being limited only by their imagination. In fact, he says, we are being limited by the imagination of somebody else: the programmer (Maeda, *apud* Hall, 1999).

The shape of a world created by lines of code is defined by the ones who program the world. I do not wish to defend a technological determinism in which we are regulated by software and programmers. However, we cannot deny that ways of representing the subject in the Internet has been strictly connected to how this world was constructed: via code.

An example of code limiting users' actions appears in the transition from a textual to a graphical interface in the construction of MUDs. Graphic multiuser environments are called virtual worlds. At first we can be tempted to think that the introduction of graphics and images revolutionized communication patterns in the Internet. The possibility of constructing three-dimensional spaces through the language VRML (Virtual Reality Modeling Language) pointed to a more natural and immersive type of presence in multiuser environments. However, the possibilities of creating one's character by means of words are endless when compared to a set of pre-defined graphic avatars available on the Web. There is the possibility of customizing the avatars by choosing different props and physical characteristics. But in the end these graphical avatars are the product of the designer's imagination, while textual characters can be described according to whatever the user imagines. According to Lawrence Lessig (Lessig, 1999, p. 63), the majority of people think about textual communication as a limitation imposed by the early Internet. Technically, it was. But this technical feature also created new possibilities for interaction on the Internet and new communication protocols among users.

Furthermore, a constant concern about graphic worlds is their digital size in bytes. Textures and rooms are constructed to be as simple as possible in order to avoid a long download time. Surely this problem tends to be minimized with broadband Internet connections, but the environment will still restricted by the programming code. This does not mean that text has no rules and no limits. The ability to create and to construct in textual MUDs requires at least basic programming skills and knowledge of the software. Moreover, MUDs are based on strict social rules. These rules include a system of privileges that segregates users according to their status in the environment. For example, basic users and guests in adventure MUDs have no privileges to create new objects and to modify existing objects. In addition, privileged users in both types of MUDs are not allowed to modify and control objects created by others, or to send remote messages to all users, actions that require a wizard or a God status to be performed. However, wizards are useless when it comes to directly accessing the system program and files, which can only be done by Gods.

Although MUDs (especially the social type) are the target of libertarian and freedom dreams, such societies are also highly hierarchical and controlled, due to the presence of wizards and Gods who have power of life and death over the citizens. Some social MUDs have neither wizards nor Gods, yet some types of social control are indeed important to maintain an organized society. When connecting to **LambdaMOO** as a guest, for example, one must read the following advice: “Guests at **LambdaMOO** are warned that they are accountable for their actions here. In particular, Guests are warned that any mail or other form of communication sent to individual characters here, may be traced back to the site from which you are logged in (…).” Actually guests in a MUD are not allowed to do much more than send messages to users in the same room, send remote messages to Gods or wizards, and to interact with objects. A well-known example of the power of some characters, even within social MUDs, is told by Julian Dibbell in the history of Mr. Bungle, A rape in cyberspace. Dibbell explains how a MUD character dominated and controlled the actions of another character against her will. As a result, Mr. Bungle was perpetually eliminated from the MUD.

3.3. MUDs as virtual spaces

The construction of virtual worlds that mimicked physical space has always stressed the distance between both. There was the “real” world, physical, and the simulated world, digital. The digital world should simulate the physical environment. This belief explains why most multiuser environments on the Internet have been spatially built following the models of the physical world. MUDs were considered "virtual," and therefore could also be viewed as "immaterial" worlds. Consequently, users could act as if they were in the physical world but not exactly. They could play with identities and modify the space in a way that would be impossible in the material world. Therefore, MUDs (as well as cyberspace as a whole) became places for the imaginary, rather than "real" places. Sherry Turkle, in **Life on the Screen** (1995), writes about people who spend more time in virtual environments than in the "real" world, using the virtual as an escape from the real.

3.3.1. MUDs and bodies

The possibility to eliminate characters and to apply penalties that are sometimes almost like medieval torture methods transforms MUDs into something very similar to dictatorial environments. According to Elizabeth Reid (1999, p. 118),

> While penal systems in the western nations that form the backbone of the Internet (…) have ceased to concentrate upon the body of the condemned as the site for punishment, and have instead turned to "humane" incarceration and social rehabilitation, the exercise of authority on MUDs has revived the old practices of public shaming and torture.

Although punishment in MUDs is very much related to physical penalties, we suggest that these practices occur exactly because people consider their existence in multiuser environments to be a bodiless experience. They envision themselves as having a virtual and non-material body. Therefore, there seems little chance of a virtual action being met with an actual response, and this sense of disconnection from physical space is what gives people the freedom for playing different roles and to assume different personas from RL (real life). Of course words may hurt, but in the Internet, "users can always resort to the off-switch on their computer" (*Ibid.,* p. 113).

The entrance warning in **LambdaMOO** somehow connects the virtual MUD with the physical world, when telling guests that their IP addresses can be tracked down and that their actions in the virtual environment can be punished in "real life." However, we are going to see that location-based mobile games enhance this situation, because users become their own avatars and actions taken in the game can indeed have physical consequences. In the Internet, however, the information one player obtains about other players consists just of their names and descriptions they chose to attach to their virtual selves. Everything one player knows about others is what they decided to show. As information is by definition flexible and subject to change, descriptions and names are also volatile.

The issue of the virtual body is not connected to whether one is present or absent in cyberspace. In the Internet, one is indeed there, although this presence is a distant presence, or a telepresence. In addition, there must be forms of representation for the virtual persona precisely because one cannot physically be on the other side of the screen. If the other side of the screen is an information space, the user should be represented in this space also as information: text, or graphics. How do we inhabit this information space? How are we be represented? How do we interact with others? How do we see others and how do others see us? These are some common questions that populated studies about MUDs during the last decade of the 20th century.

Margareth Wertheim (1999, p. 268) points out that cyberspace has been seen as an immaterial space because it has inherited the idealism of medieval Christian soul space. Accordingly, the separation between mind and body that occurs in cyberspace would be an inheritance from the Catholic worldview developed by Cartesian bias. The author suggests that the idea of cyber-immortality[16] is an attempt to re-envision a medieval soul in digital form.

> The idea that the "essence" of a person can be separated from his or her body and transformed into the ephemeral media of computer code is a clear repudiation of the materialist view that man is made of matter alone. When the further claims that this immaterial self can survive the death of the body and "live on" forever beyond physical space and time, we are back in the realm of medieval Christian dualism. Once again, then, we see in the discourse about cyberspace a return to dualism, a return to a belief that man is bipolar being consisting of a mortal material body and an immaterial "essence" that is potentially immortal.

Of course, as pointed out by N. Katherine Hayles, (1996, p. 6) the body is neither simply material object nor information pattern, but both at once. Both of these instances cannot be separated and there is no hierarchical order between them. We saw in chapter 1 that modern physics has gradually abolished matter in function of space (Wertheim, 1999, p. 217). In this sense, the body has been included in the category *matter*, and has

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[16] Cyber-immortality, according to Wertheim (1999) stands for downloading one's mind forever into a dataspace and getting rid of the mortal physical body.

slowly been dematerialized to form a virtual body. In **Neuromancer** (2000), the characters could download their minds into cyberspace, leaving the body behind. Case, the main character in the novel, receives a penalty in the beginning of the narrative: He can no longer connect to cyberspace, and is imprisoned in his own body. But why is it such a bad thing to stay with one's physical body? Also in **Neuromancer** there is another character, Pov, who is merely a "point of view." Pov is fully made out of information, completely free from its material body. This idea, also developed in other science fiction novels like Hans Moravec's **Mind children,**[17] implies a dualistic vision in which the mind could be separated from the body. Today, however, we can perceive that materiality in cyberspace is indeed important and much of the interaction depends on physical sensations.

The influence of this dualistic view of cyberspace on MUD players' behavior is exemplified through diverse statements from users in Sherry Turkle's **Life on the screen** (1995): "My real life is exhausting that way. I'm always protecting myself. On MUDs I do something else…" (*Id.,* p. 208); "[on the MUD] I saw in her what I wanted to see; real life gave me too much information" (*Ibid*., p. 207). These are just two quotes, among several, which exemplify how users feel "differently" on MUDs because they considered this space as a virtual instance, which, although real, happened parallel to their "real lives." These players realized some connection between VR and RL, however, as Margareth Wertheim (1999, p. 41) puts it, the virtual space was outside physical space. Therefore users are tempted to act differently, or at least to consider their actions to be of a different status. Turkle (1995, p. 196) showed that often MUD players used their virtual characters to solve and work out psychological problems in their RL, like a boy who had a lot of friends in the MUD because he felt alone in RL, or a girl who liked to help other people in her VR because she felt she did not have enough attention from her parents in RL. Sometimes these actions improved their behavior in RL, other times, it only contributed to the user's addiction to the MUD, who was connected to the computer for longer periods of time than to RL.

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[17] Moravec, Hans. **Mind children:** the future of robot and human intelligence. Cambridge, Massachusets : Harvard University Press, 1998. 214 p.

In all these examples, we can perceive the separation between the virtual space of MUDs and the real space of life. Turkle (*Ibid*., p. 205) seems to affirm that people do play roles in MUDs, acting differently than in RL, when she narrates the story of Stewart. Stewart was a MUD player who repeatedly insisted that he played no roles in MUDs, for he was in fact playing himself. Yet during one group session, explains Turkle, a member of the role-playing contingent asked Stewart if he was married, to which he promptly responded "yes" and blushed afterwards, because he was not married in RL. Nonetheless this story can be understood in a different way. The fact that Stewart affirmed he was married, even if the wedding had happened in the MUD, shows that he considered his life on the MUD as a part of his life.

The fact that the virtual space of MUDs has been considered disconnected from the real space of life, plus the fact that one could not be physically there have been decisive in the creation of virtual characters and environments as literal representations of physicality. Characters in adventure MUDs are hungry and thirsty, and also need to sleep.

3.3.2. The virtual city—from places to spaces

Like bodies, cities are also material entities. Like the desire to reconstruct an immaterial body in the virtual space of the Internet, the wish to build the virtual city has been strongly connected to the development of multiuser environments. Many books have been written about virtual spaces as metaphors of the city, like William Mitchell's **City of bits** (1999) and Judith Donath's **Inhabiting the virtual city** (1997).

The concept of cities as public and gathering places begins along with the emergence of Greek society. The difference between public and private spheres are closely related to the Greek idea of *polis*, with the appearance of the first city-states. Hanna Arendt (*Apud* de Souza, 2002, p. 11) defines public as opposed to private. Private means privation, in this context privation of the exercise of political life, which took place in the *Agora*—the first public space. At the end of the Roman Empire, the author shows the transformation of public into social. In this sense, public spaces are the places in which people with private common interests meet, representing the first blurring of borders between public and private. According to Julieta de Souza (2002, p. 14), "the public sphere is the place in which topics interact, are mutually modified by contact with other people, acquire a mundane format, and start to compose the 'reality' viewed and listened by all."[18] By this definition, the term *public* means the world itself.

Public spaces then originally suggest spaces in which people interact with each other and socialize. Consequently, public spaces are locations where communities are developed. However, with the emergence of advanced transportation and communication technologies, like the train and the telegraph, cities have become increasingly places of displacement. This means that citizens started to circulate fast across the city, going from place to place, but without enjoying the space "in-between" points.

Forgetting the space "in-between" is a characteristic of network systems. A network, as defined by Pierre Rosenstiehl (1998, p. 229), only considers specific connections, and never looks at the paths. The network-man can play with alternate paths and "completely ignore that a flight Paris-Argel flies over the Mediterranean"[19] (Rosenstiehl, 1998, p. 229). The joy of the "in-between" space points to a characteristic of traveling before the invention of the railway, which sped up the action of going from place to place, "eliminating" the travel duration. What happens next is a transformation of urban places into spaces of displacement, or circulation spaces, in which there is no longer communication while moving through space. After the railroad, communication was definitely separated from transportation. As we have seen, the act of traveling has been essential to define imaginary spaces and to design maps, since the journey itself was important for communication and imagination, not only the final destination. The elimination of physical space from the act of traveling transformed the creation of imaginary spaces and communication in public spaces. It is no wonder that community environments have partially moved to cyberspace, which had also been developed as a connected space, and social network. The lack of communication in public spaces can be considered to be one of the factors that carried multiuser environments from physical spaces to the virtual space of the Internet. Also, the wish to recreate the lost *Agora* often led to the construction of literal representations of the city as a physical space. Even

[18] "A esfera pública é, nesse sentido o lugar onde os assuntos interagem, são mutuamente modificados pelo contato, adquirem um formato mundano e passam a compor a 'realidade' vista e ouvida por todos."
[19] "Pode ignorar tranqüilamente que um vôo Paris-Argel sobrevoa o Mediterrâneo."

being informational virtual spaces, possible to be imagined in several different ways, almost all MUDs have been constructed around the metaphor of physical spaces.

The desire to connect multiuser environments to the "real life" was one of the factors that contributed to their close relationship to physical spaces. Even if the Internet is an information space, and it is possible to live inside a TV,[20] almost all spatial metaphors are connected to physical spaces. People generally feel more comfortable in environments that are familiar to them, and they consider this familiarity as one of the responsible factors for promoting sociability and interaction.

The creation of imaginary spaces analogous to the physical world are not new. As shown, Dante's hell, purgatory, and heaven have been described in terms familiar in the physical world. Although symbolic places, they were described as people perceived the world to be at that time. Hell was in the center of the Earth, purgatory somewhere in the southern hemisphere, and heaven was placed in the upper part of the maps. These connections to physical space helped people to imagine these places and project themselves into them.

The main question behind the creation of MUDs, especially graphical virtual worlds, was "how do we construct the virtual city?" The city, in this case, has always been the paradigm for a social and interaction place. For example, **AlphaWorld**,[21]the three-dimensional virtual world with the biggest population in the Internet, has been modeled completely after a traditional city. Other 3D virtual worlds like **Habbo Hotel,**[22] and **Cybertown**[23] follow the same rule.

There have been some suggestions, as proposed by Donath (1997, p. 22), to transcend the literal representation of physical cities and to create abstract graphic interfaces to represent online conversations. These attempts resulted in the creation of **Chat Circles**[24] (1999) to visualize chats, in collaboration with Fernanda Viegas (Sociable

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[20] As was the case of Julian Dibbell's character in **LambdaMOO** (Dibbell, 1998, p. 42).

[21] Available at: http://www.activeworlds.com. Accessed on: 17 Dec. 2003.

[22] Available at: http://www.habbohotel.com/habbo/en/. Accessed on: **Habbo Hotel** won the **Golden Nica Prix Ars Electronica** in 2003. The multiuser environment is a virtual hotel where you can hang out and make new friends. It is designed for 14- to 20-year-olds. Launched in January 2001, the site already has a community of nearly three million members. Members create a customized animated character, known as a Habbo, who can walk, dance, eat, drink, and chat in the cafes, restaurants, swimming pools, and game rooms. Guest rooms are free to own a wide range of purchasable virtual items.

[23] Available at: http://www.cybertown.com/main_ieframes.html. Accessed on: 17 Dec. 2003.

[24] Available at: http://chatcircles.media.mit.edu/. Accessed on: 17 Dec. 2003.

Media Group, MIT), **Visual Who**[25] (1995) to visualize mailing lists, and **Loom**[26] to visualize Usenet groups, among others. Donath (1997, p. 18) points out that a virtual world is similar to the physical environment because both are populated by millions of people, most of whom are strangers to each other. She affirms that due to the immense population of physical cities, urban social ties are relatively weak. Surrounded by strangers, the inhabitant of the big city is much more anonymous than the small-town dweller.

Similarly, ties in the virtual world can also be weak. There are millions of people on the Internet every day, but they may not even perceive the presence of others online. Multiuser environments are constructed so that the interface can represent the presence of others and create a virtual gathering place. According to William Mitchel (1999, p. 22), what creates the sense of space on the Internet is merely the access to the same information. "At their simplest, shared places are created by displaying the same scrolling text on multiple personal computer screens." Nevertheless, even in text-based multiuser environments, the necessity of describing the virtual space as a physical place has been evident. Online environments, even if conceptualized as *different* from the physical city, have been constructed as a *comparison* to the physical city.

Often these "online cities" have been advertised and constructed as places that could be better than the physical city. First, because one could connect to people due to common interests, rather than due to physical proximity. Second, because many problems of the physical city could be avoided, since they did not need to be represented. However, the utopia of online communities was exactly to assume that they could be created without physical basis, that is, without former existence in the physical world. Many "world designers" thought that anybody could create a new world, and that this world would be populated and grow. Also the fear that communication would move almost completely to the online environment, and that people would not need to leave their homes because they would find everything in cyberspace, proved false. Digital technology is being adapted to mobile devices, bringing communities and interaction to physical space.

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[25] Available at: http://smg.media.mit.edu/projects/VisualWho/. Accessed on: 17 Dec. 2003.
[26] Available at: http://web.media.mit.edu/~kkarahal/loom/. Accessed on: 17 Dec. 2003.

3.3.3. MUDs as labyrinths: mapping virtual spaces

The Web has become almost synonymous to a labyrinth due to its hypertextual model. However we should not forget that labyrinths are originally physical structures and invite exploration, facts related to the figure of the traveler. According to Rosenstiehl, (1988, p. 248) the original labyrinth metaphor is connected to the traveler, the one who explores everything without a map, and then returns to the starting point. The author points out the difference between the traveler and the architect: The traveler is an errant person who explores the labyrinth and views it as an infinite structure, while the architect constructs the labyrinth and therefore knows it is finite. Yet, who really constructs the labyrinth is the traveler and not the architect, for the labyrinth is not an architecture or a network, but the space itself which unfolds before the traveler.

The labyrinth is an invitation for exploration of the space. In this sense, we can consider the traveled space in the Middle Ages as a labyrinth. The unexplored space that constituted the imaginary reality was indeed the ultimate labyrinth that was gradually unfolded in front of the traveler. Rosensthiel (*Ibid.,* p. 252) argues that the traveler needs to explore without a map, and needs to read on the ground the marks left from older passages. "This unwarned traveler is not a topographer: he does not construct the map of the labyrinth."[27] The labyrinth then answers to a desire to discover, and discovery turns out to be synonymous with construction of space, for the space only exists after it is explored (*Cf.* De Certeau *apud* Fuller; Jenkins, 1995, p. 66).

The immersiveness of cyberspace is due to its spatial characteristics: the ability to interact with the environment, which is accomplished following links or going from room to room. MUDs have a labyrinthine structure first because they are made out of interconnected rooms; second because there is no map to explore the MUD environment. Such a map would be impossible, since MUDs' territories are constantly changing. The territory of such games is not stable; it is perpetually being constructed. Contrary to traditional board games, nobody walks through a MUD following the same path.

[27] "Este viajante desprevenido não é topógrafo: não faz o mapa do labirinto."

Therefore the hypertextual structure of MUDs matched perfectly with the Internet organization.

Julian Dibbell (1998, p. 47) exemplifies the problem of mapping a MUD when describing a journey he decided to take in order to see the whole **LambdaMOO.** The author was looking for a place to build his home, and realized that just wandering from room to room could take days, for he was not aware of the size of the MOO. Then he decided he needed some way to step back and look at the MOO as a whole. Walking toward an adjacent room he found three hot-air balloons, from which he chose the scarlet one, and clambered into its basket. As he flew up in his balloon, he realized that the sky program did not provide the coherent overview he was looking for, like a sequenced selection of texts describing **LamdaMOO's** various outdoors locations. He flew over a series of diverse spots, "with no sense whatsoever of how any of these places was connected to any other, or even whether they were connected to the greater topology of the MOO at all" (Dibbel, 1998, p. 48).

He then decided to go as high as he could with the balloon, and typed "look down." The software description was the following: "As you drift, you see all of **LambdaMOO** spread out below. It's hard to pick out details from such a high altitude, though" *(Id.)*. By this explanation, Dibbell realized it was not possible to see a map of the whole MOO, for the essential characteristic of all VR environments is this: fill in the details on your own. Therefore, the only possible map that he could access would be the map constructed by his imagination, given that multiuser environments are basically the product of players' imagination.

> The more consideration I gave to the equally recalcitrant fact that the MOO's geography, besides being a deeply chaotic thing, was a highly volatile one as well, with random regions being built in and removed all the time (…) It occurred to me that there was in fact one map that represented the width, breadth, and depth of the MOO with absolute and unapologetic reliability—and that map was the MOO itself. (*Ibid.,* p. 51)

As we saw, the 1:1 map is not a feasible one. It just exists in order to destroy the territory. In this sense, MUDs are indeed labyrinths, inviting exploration without a possible map. Removing the map is the only possibility for creating MUDs as imaginary spaces, which are unknown and unexplored places.

Of course it is possible to map information flows and patterns in the Internet. After all, graphic interfaces are created to visualize information. However, while this "mapping" is useful for conversational histories (e.g., **Chat Circles**), representation of information flows,[28] or statistical purposes, it is not possible to map a game. We can realize that attempts to map online MUDs either follows too closely physical maps, or fails in the challenge of representing a volatile and ever-changing environment. Most of them are flat sketches of the MUD room structure in an early or static representation of the MUD space. Examples of MUD maps are shown by Martin Dodge and Rob Kitchin in **Atlas of Cyberspace**, like the first sketch from **MUD**, **PhoenixMUD,** and **Discworld MUD** (Dodge, Kitchin, 2001). Peter Anders and his students made a first attempt to map **BayMOO,**[29] a public text-based social MOO hosted at San Francisco State University. Anders[30] (1996) argues, "if visitors can 'see' the extent of the MUD, they might be more inclined to explore it." However, the great contribution of MUDs in order to immerse the player in the environment was exactly taking the map out of the game. Also Dodger and Kitchin (2001, p. 180) point out the difficulty of mapping an ever-changing environment: "Much of this change is unplanned, the creative outcome of individual actions resulting in an evolving, organic structure."

The true labyrinthine experience also does not include a map, for the map, when representing the territory, occupies the space formerly filled by imagination. That is why 3D graphic multiuser environments did not really encompass all potentialities of what a virtual space should be. Likewise, virtual worlds could mostly never withdraw from the representation of the physical city. What is the advantage of **AlphaWorld's** (ActiveWorlds) satellite view over the imaginary sky program from **LambdaMOO**?

Perhaps the most interesting attempt to map a MUD has been done by Michael Kearns, Charles Lee Isbell Jr., and colleagues as an AI research project at AT&T Labs. They created a software agent, called Cobot,[31] that "lives" in **LambdaMOO** since June 1999. Cobot observes the social interactions of players and shows the complex social

[28] Cf. the Web site **An Atlas of Cyberspace**. Available at: http://www.cybergeography.org/atlas/atlas.html. Accessed on: 17 Dec. 2003.
[29] Available at: http://www.baymoo.org:4242/. Accessed on: 17 Dec. 2003.
[30] Anders, Peter. Envisioning cyberspace: the design of online communities. In: **Fifth international conference on cyberspace,** June 6-9, 1996. Available at: http://www.telefonica.es/fat/eanders.html. Accessed on: 26 aug. 2003.
[31] More about Cobot: http://cobot.research.att.com.

connections between all **LambdaMOO** inhabitants based on their verbal and non-verbal interactions. A social map is an ever-changing structure and it does not map the MOO space, but its *social networks*. The need to visualize and map the environment caused MUDs to fail as projections of imaginary spaces.

4. ART, GRAPHIC INTERFACES AND VIRTUAL SPACES: CASE STUDIES

4.1. Art and graphic virtual worlds

There is a strong connection between art and the imaginary. It might be common sense to remember that artists have always tried to represent imaginary spaces, expressing a particular worldview. This representation of the world through art has been one of the main reasons for the mathematization of terrestrial space and later celestial space, leading to a unification of both, as shown in chapter 1. On one side, art sometimes leads to unexpected scientific developments. On the other side, artists push the limits of technology further, envisioning new developments for existing tools or interfaces. Mainly after the emergence of digital technologies, it was clearer that artists inquire about the relationship between physical and virtual spaces, and about how to change our perception of both spaces through diverse physical interfaces. However, looking back at early telecommunications-based art, also known as telepresence, we can realize the wish to merge physical and virtual spaces was already present long before the existence of nomadic technology devices. The emergence—and sudden ubiquitousness—of the Internet and virtual reality often overshadowed these tendencies, emphasizing the expansion of a virtual world, cyberspace, developed outside physical space.

Curiously, there are few artistic experiments using MUDs or virtual worlds. There are many examples of commercial virtual worlds, like the previously mentioned **AlphaWorld,** or MOOs developed by universities with teaching purposes, like the ones created by Amy Bruckman at Georgia Tech.[1] Perhaps the main reason for this lack of artistic exploration into online multiuser environments is connected to the fact the these spaces were originally descended from games. And games are not usually considered art—they suffer from their association with the likes of Atari and Nintendo. Nevertheless, the technology that developed them has inspired a number of artists who have endeavored to make the immersive medium their own, moving away from game format toward the construction of an aesthetic experience.

[1] See http://www.cc.gatech.edu/~asb/ for a complete list of Amy Bruckman's works. Accessed on: 17 Dec. 2003.

Game technology has led the development of several virtual worlds, but few multiuser virtual environments in the Internet. These virtual worlds inherited from the first virtual reality systems use a Head Mounted Display (HMD) and some other physical interfaces, like a data glove. Some artistic examples of these types of environments are Char Davies' **Osmose** (1995) and **Ephémere** (1998),[2] and Brenda Laurel and Rachel Strickland's **Placeholder** (1992).[3]

One focus of this chapter is graphic multiuser environments,[4] since they have been envisioned as the successors of text-based MUDs. This chapter is divided into two parts. The first part concentrates on artistic experiences on graphic multiuser environments and on the relationship between art and games. Multiuser environments evolved into three different styles: one that utilizes synchronous communication and tries to graphically reproduce a social MUD, like Gilbertto Prado's **Desertesejo**.[5] The second type questions the amount of time spent by the user to participate in these environments, creating autonomous bodies. The example is Victoria Vesna's **N0time**.[6] Finally, we can cite **Technosphere**, by Jane Prophet and Gordon Selley,[7] which is also independent of synchronous communication and relates more to artificial life simulations on the Internet, following the experiments developed by Karl Sims previously mentioned in the first chapter. The second part of this chapter looks to find in art the way back to connect physical and virtual spaces. Here an overview of earlier telematic art helps us to understand that the wish to connect people at distance and to merge physical and virtual is older than "cyberspace."

4.1.1. When game meets art

Although not originally an online environment, **Imateriais** is a singular example of an artistic experiment to create a 3D multiuser virtual world that utilizes video-game technology in Brazil. It has been idealized by Jesus de Paula Assis, Ricardo Ribemboim,

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[2] Cf. http://www.immersence.com.
[3] Cf. http://www.tauzero.com/Brenda_Laurel/Placeholder/Placeholder.html.
[4] I use the term "graphic multiuser environments" instead of "virtual worlds," as employed by Dodge and Kitchin, (2001) because virtual worlds can also be singular and off-line experiences.
[5] Cf. http://www.itaucultural.org.br/desertesejo.
[6] Cf. http://notime.arts.ucla.edu/notime3/.
[7] Cf. http://www.cairn.demon.co.uk/technoweb1.html.

Celso Favaretto, Ricardo Anderáos, and Roberto Moreira for the Itaú Cultural exhibition that took place in São Paulo in 1999. Similar to other online graphic games such as **EverQuest**[8] or **Ultima Online**,[9] **Imateriais** has a fixed game space determined by the game designer. However, unlike adventure games, it raises issues connected to the relationship between physical, virtual, and materiality inside a multiuser environment. Furthermore, it connects game and art in a unique way. At that time, the authors emphasized the use of video-game technology to develop an environment that was not a game, since it had no competition among users.[10] No competition is exactly what defines a Social MUD. After the exhibition, the authors pointed to a frequent complaint from children, because there was nobody to kill, similar to what Char Davies also noticed in relation to **Osmose** and **Ephémère**. But constructing a killing game was not **Imateriais's** goal.

With the intention of discussing the ongoing concept of virtual and its relationship to materiality, Itaú Cultural developed a media arts exhibition with the same name, immaterialities. The goal of the art show was reediting **Les Immatèriaux**, the French exhibition from Georges Pompidou that took place in 1985, but now in a virtual medium. **Imateriais** is an example of how multiuser environments were considered (virtual) spaces, and how their authors challenged some basic issues related to these types of environments.

Imateriais is a 3D modeled virtual multiuser environment that plays with the relationship between feeling and seeing. 3D virtual worlds are visual spaces, around which the user can walk. The main interfaces used to connect to these places are a monitor, a keyboard, a mouse, and sometimes the HMD. Consequently, there is generally no use of any other senses except for sight. **Imateriais** challenged this statement by creating several interconnected rooms, with the five senses as themes: taste, touch, smell,

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[8] Available at: http://www.everquest.com. Accessed on: 10 Jan. 2003.
[9] Available at: http://www.ultimaonline.com. Accessed on: 10 Jan. 2003.
[10] The game was built over the game engine Genesis, under the technical direction of Marcos Cuzziol. The environment and the avatars were modeled in 3D Studio and imported to the game. The server has also been developed over the Genesis platform, and complemented with C++. The user database was MySQL.

hearing, and sight. The goal, according to the authors, would be to study "the impact of simulated sensations on a simulated body."[11]

Pictures 13 and 14: Imateriais' graphic interface

In order to be immersed in the virtual world, the visitor first had to walk through the exhibition, whose goal was to stimulate the senses. For instance, there was a room with several smells as different as a dentist's office, or a recently cleaned house. There was another room with eatable little balls with unusual tastes, and also a room with holes through which the visitor could poke her hand and feel what was on the other side. After all this sense stimulation, the visitor finally approached the 3D environment.

Before entering the world, each participant was prompted to take a picture of her own face, which would be used as her avatar's face. Once again, traditional identity issues in virtual worlds were challenged. Multiuser environments had been widely studied as spaces of liberty mainly because there was no need to identify oneself, and the user could choose as many identities as she wished. In **Imateriais** the user could not hide her identity, for the still picture provided an obvious clue. The context of an exhibition created an even more ironic situation, because one could be visiting the show with a friend (in physical space) and suddenly meet her (in virtual space). One would know with whom she was talking, but her face would be no more than a still picture.

Participants in the multiuser environment were allowed to talk to each other. The sound was also spatially located, so if someone screamed, her voice was audible even to people who were not in the same room. Some visitors related that in order to find friends

[11] Imateriais em meio virtual. CD-ROM **Imateriais** (1999). *"O impacto de sensações simuladas sobre um corpo simulado."*

in the virtual world they would scream their names and ask, “Where are you?” The comedy of this situation, though, is that the environment created a double sense of space, since the one who was being looked for in the virtual world could be right by your side in the physical world. Although the avatar had a first-person perspective, users could view their reflections on several mirrors in the environment. Mirrors also served to augment and duplicate the space, since when approaching a mirror, the feelings was generally like meeting somebody else. After a while, you would find out that this other person was only a reflex of yourself.

Another important issue concerning the experience of **Imateriais**, according to the authors, was showing the visitor that the borders between material and immaterial are more fluid, first avoiding the optimism of “techno-utopians” who consider the virtual as a perfect place for human relationships, and second evading the pessimism of the “neo Luddite,” who envisions the virtual as the end of interpersonal relationships.[12] Most important, **Imateriais** aimed to take physical sensations to the virtual space. When the majority of virtual worlds’ designers were only concerned with the virtual space, **Imateriais’s** authors looked for connections between the physical and the virtual. The “physical virtual world” was visited by more than 12,000 visitors in one month and allowed 25 persons to interact simultaneously.

The virtual **Imateriais’s** exhibition could be visited on the Internet since the opening of the physical show in August 1999, until May 2000. On the Internet some features of the environment could not be completely enjoyed. The world was still multiuser, including up to 32 persons simultaneously. However, these users could not use their voices to talk to each other and they could only choose predefined avatars, as generally happens in online graphical worlds. The body of the avatar was the same, although one could choose among several types of eyes, noses, and mouths, or choose to upload her picture as the avatar face. The Institution Itaú Cultural also released a CD version of the virtual world much like the Internet version, except for the multiuser feature.

[12] Imateriais em meio virtual. CD-ROM **Imateriais** (1999). *“(1) o otimismo de “tecno-utópicos” (o é preferível ao real para as relações humanas(...)); (2) o pessimismo dos neoluditas (o virtual é o fim das relações interpessoais físicas (...)).”*

Imateriais was re-exhibited in 2001 in the Museum of Image and Sound in São Paulo. In 2003 Itaú Cultural developed a new exhibition about the history of electronic games, **Game o quê?** in which the 3D world was one of the attractions. Although **Imateriais** is not an adventure game, the authors were inspired by the history of electronic action games. Looking at how their interface evolved in the last 30 years can also give us a clue to how multiuser environments have become graphic places.

The first videogames were related to fighting, war, and shooting. With the development of graphical interfaces some of them evolved to include other themes, such as role-playing games. However, the strong association with action games has sometimes prevented games from merging with art. Considered the first videogame, **Spacewar!** created in 1961 at MIT, was composed of monochromatic points, and simulated an outer space environment. In addition to being the first electronic game, it was also the first computer simulation to have a graphic representation. Eleven years later, in 1972, **Pong** was the first game to have a massive distribution, as people could take it to their homes. **Pong** was inspired in the oscilloscope, an electronic instrument that allows the visualization of electrical waves on a fluorescent screen, as of a cathode-ray tube like a TVs and computer screens. In Brazil, it was commercialized with the name **Telejogo Philco** in 1974, tells Jesus de Paula Assis.[13] **Pong**, as many of us remember, was a stylized tennis square. Two buttons controlled the movement of two sticks, with which the player could hit a ball. The goal of the game was to keep throwing the ball into the opponent's area until she could not return it. Videogames continued to develop and **Pac-Man** was released in 1980. Interestingly, the goal of the game developer Moru Iwatani was to create a game that would be different from the shooting/killing experience of former games and that looked more like a cartoon than a videogame. Also, **Pac-Man** introduced a labyrinth as the game space. The game consists of a head that moves through a labyrinth eating points and running from phantoms that try to stop it. The DOS interface of **Pac-Man** migrated to Windows and Macintosh operational systems, after the development of the desktop graphic interface, becoming the prototype of what we understand today to be the "classical" videogame.

[13] Breve história dos jogos de ação. CD-ROM **Imateriais** (1999).

This story changed quite a bit around 1992, when two events happened simultaneously: Personal computers became fairly affordable and the first-person shooter game titled **Wolfenstein 3D** was released for DOS by ID Software. This 3D game quickly exceeded the popularity of the most well-known DOS game of that time, **Prince of Persia**. **Wolfenstein 3D** was originally a board game and the electronic version was modeled after a labyrinth with six adventures, each of them with nine levels of increasing difficulty. In the next two years similar games were created, like **Commander Keen** and **Ken's Labyrinth**. The labyrinthine structure is one of the main links between action games and adventure RPGs.

In 1994, another important step in the history of action videogames happened. After the success of **Doom**, ID Software releases **Doom II**. The story is similar to **Doom's**: A solitary player comes back to Earth and finds the planet overloaded with extraterrestrial aliens. The player is then compelled to fight against them, going through different levels, and using different types of weapons. **Doom II** improved **Wolfenstein 3D's** graphics and realistic appearance. The shadows were more perfect, the players actually "walked" instead of sliding over the floor, and they could walk up and down stairs in high-rise buildings. The levels in **Wolfenstein 3D** were single-layered; this means that even though the game was a "3D first-person shooter," one could only move in two dimensions: left/right and forward/back. One could not jump, crouch, or climb stairs. **Doom** added the ability to walk up stairs creating differing heights.

Yet the most important innovation brought by **Doom** (the first one) was the multiuser feature. Up to four players could share the game space over the Internet or on a local network. They could then fight against each other, or against the monster that would eventually show up. Later other more graphically advanced types of games following this style were developed, like **Duke Nukem 3D** and **Quake**. All of these games had two common characteristics: the rule to "see and shoot" and the labyrinthine space.

Walking through labyrinths is a common characteristic of the history of games in general, and also belongs to role-playing games and MUDs. Conversely, the rule "see and shoot" had been abolished from role-playing games since its origins. Although players could eventually fight with each other, this was not the main goal of the game. Furthermore, social MUDs completely eliminated the "adventure" part of the game. It would be naïve to say that games necessarily "evolved" from action to social environments. It is clear that the multiuser feature transforms the game environment into a more "social" experience—opposed to the solitary act of playing. However, this ludic gathering space can be used as a conversational environment, in order to enroll in a social adventure, and also to kill enemies.

The association with killing and shooting has also contributed to considering gaming incompatible with art. On the other hand, one can perceive that the development of computer games is always a matter of creating fictions, and fantasy worlds, experiences in very close proximity to art. The 2001 edition of the Prix Ars Electronica[14] has expanded the *Internet* category into two discrete groups: Net Vision and Net Excellence. Ars Electronica is the most important arts competition in Europe and it is significant that the Golden Nica award in the Net Vision category has been given to **Banja**, a graphic online multiuser game.[15] Moreover, the second nomination in the category is also a game: **Phantasy Star Online**.[16] Also among the honorary mentions in Net Excellence, we find **Austropolis**,[17] a political simulation game, **Netbabyworld**,[18] a Net-based game for kids, and **Fuckedcompany,**[19] an online game played on an HTML Web site.

Among these five types of games, only **Phantasy Star Online** explores a 3D interface and has some similarities with "seeing and killing" games. **Banja**, **Netbabyworld,** and **Austropolis** are social environments with two-dimensional interfaces, while **Fuckedcompany** is an HTML Web site, which functions as a game that criticizes the failure of .com companies in the Internet. These places are similar to MUDs because they have the configuration of a social environment inside a game world.

Banja[20] is a Flash-based environment developed by the French group Team cHmAn, in which the user is able to access games, animation sequences, media, and community tools. The game is basically a narrative that takes place in monthly episodes

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[14] Cf. http://www.aec.at.
[15] Available at: http://www.banja.com/home2004/index.htm. Accessed on; 11 Jan. 2004.
[16] Available at: http://score.sega.com/games/phantasystaronline/dc/opening.shtml. Accessed on: 11 Jan. 2004.
[17] The game is no longer online. The original URL was http://www.austropolis.at.
[18] Available at: http://www.netbabyworld.com. Accessed on: 11 Jan. 2004.
[19] Available at: http://www.fuckedcompany.com/. Accessed on: 11 Jan. 2004.
[20] **Banja** also won the EuroPrix 2001 in the category Fiction and Interactive Stories.

in a place called Itland. As soon as the user logs in, she is embodied in a Rastafari avatar which, together with a little bee, goes through some rooms where he can find diverse online games, such as darts. The user can always access other users' scores and exchange tips and experiences in the forum. Also there is a chat environment in which the user is able to build new chat rooms or join existing ones. The game creates a whole new virtual world about which the user can read news and download all sorts of goodies like screensavers and wallpaper. **Banja** is interesting due to its cartoon-like appearance and the narrative qualities of the story, but it is far from virtual worlds concerning the interaction with the environment and role-playing. By interaction with the environment I mean the feeling of immersion in the space (which can be accomplished by the ability of moving through a 3D space and/or modifying this space. Also, by role-playing I mean the possibility of creating your own avatar and the degrees of "liberty" that the user can have between choosing among predefined avatars, customizable graphics, or text-based personas.

Also using a cartoon-like interface, **Netbabyworld** is a game community adapted for the Internet and built around a group of characters living on the Netton-Peninsula. The game concept is similar to **Banja**: the user can choose to play several types of online Shockwave games, such as Ninja Girl, Tune Inn, or Boatrace, download graphics and movies, or join the player lab, which includes citizens of Nettown and other game players from the community. **Netbabyworld** is specifically designed for children and is developed in a two-dimensional interface.

Phantasy Star Online differs from the previously mentioned works for the fact that it is a 3D multiuser role-playing online game. The game is modeled like a traditional adventure MUD, in which players go to outer space in order to colonize distant planets. The authors of the world suggest that their goal was to come up with the best way for people to communicate and interact with each other, creating an online game based on the world of Sega's legendary RPG series **Phantasy Star**. (LEOPOLDSEDER; SCHÖPF, 2001, p. 34) When joining the game, the player is able to explore the online adventure world with a maximum of four other players through the Internet. It is notable that the 2001 Prix Ars Electronica catalog introduces **Phantasy Star Online** as a trend toward the convergence of the Internet and game entertainment. Also the editors suggest that "the gaming world is picking up impulses from the Net: based on concepts of collaboration and community, the dimension of networked playing is, indeed, looming large" (*Ibid.,* p. 20). This statement is partially true. Although the Internet has indeed enhanced the meaning of *community*, allowing huge amounts of people to get together without the need to share the same geographical location, RPGs have always been community-based. The novelty, however, is admitting that the gaming world can in fact fuse with art. "**Phantasy Star Online** is particularly striking because of its luminous, other-worldly graphical surface, utilizing themes from high tech, science fiction and fantasy worlds, where entertainment merges into art," say the editors *(Id.)*.


Pictures 15, 16 and 17: Banja, **Netbabyworld**
and **Phantasy Star Online** environments.

Nonetheless, there are not so many initiatives that merge games, art, community, Internet, and 3D interfaces. This happened partially because, as stated, graphic interfaces "map the game," destroying much of the fantasy and imagination necessary to play role-playing games and construct MOOs. Another reason is technological and has to do with the (non)development of the language VRML.

4.1.2. Artistic explorations of online multiuser environments

John Maeda pointed out that the designer is restricted by the programmer's imagination. Similarly, in most 3D worlds, the user is also restricted, but this time by the designer/artist's imagination. This does not mean that beautiful and interesting environments cannot be created. However, the way to interact with these spaces is restricted by their representation.

While HTML provides immersion through links, the emergence of VRML in 1994 allowed the modeling of three-dimensional objects in virtual space, transferring the immersive element from links to the Z-axis. The process of hypertextual *reading* then transformed into *walking* through digital spaces, and depth started to be visualized by means of perspective. VRML also allowed the sharing of digital spaces in a new way, for users could actually *see* graphic representations of each other.

As suggested, the problem started when artists and designers needed to construct interfaces which could promote virtual encounters and transform the digital environment into a pleasant place. How is that done without literally mirroring the physical city and its citizens? And how does one create graphic interfaces that do not take the imagination away from virtual worlds?

Three-dimensional graphic interfaces held some peculiar characteristics related to the representation of virtual networked spaces. At first, they created an unfolded space, allowing the user to have a global vision of the virtual environment. This attribute is a bit paradoxical if we think that the WWW grew based on a hypertextual structure, which represents a fragmented vision of space, like a folded map from which we cannot see beyond the folds (or the links). In addition, when inhabiting one of the network nodes, it is only possible to visualize other nodes, but never the borders. It is therefore impossible to trace a map.

There was the common belief that integration with the environment would be reinforced with the addition of one dimension to both screen dimensions, creating a three-dimensional space. According to Dodge and Kitchin (*op. cit.,* p. 195), graphic worlds "are perhaps the closest form of online interaction to the shared, immersive VR worlds envisaged by cyberpunk writers." The main difference between these environments and 2-D interfaces is that depth is no longer suggested, but visible.

An example of a 3D online artistic virtual world has been developed by Gilbertto Prado in 2000. ***Desertesejo***[21] represents one of the few artistic initiatives to create virtual worlds in the Internet, whose goal is not acquiring points, but socializing. Moreover, the ultimate goal of the environment is perceiving its own space, creating an aesthetic experience. Prado created a simulation that should appear like a dream space, a place for

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[21] Available at: http://www.itaucultural.org.br/desertesejo/home.htm. Accessed on: 24 Jan. 2004.

meditation and introspection. Therefore he tried to develop a 3D space disconnected from traditional game environments, which generally is formed by a maze with walls through which the user should walk. **Desertesejo** is more like an empty smooth space,[22] a desert, only composed of ground, air, and sky. In order to "fill" the environment, the user should use her own imagination. The virtual world includes three different spaces, from which the largest one is a place where the user travels alone. This room is called Gold, and is the zone of silence. Crossing to the second space, Viridis, the user can see traces of other visitors, but cannot actually meet them. Finally, the third room, Feathers, is the 3D chat, and it is also the axis of dreams and mirages according to the author. Prado suggests that "**Desertesejo** is a poetical exploration of geographical extension, temporary ruptures, loneliness, constant reinvention, and proliferation of points of meeting and sharing" (Prado, Assis, Ribenboim).

The world, programmed in VRML, allows the participation of 50 users at the same time. In order to enter the virtual environment, the user has to choose one of the stones that fall from the ceiling of a cave. Depending on the arbitrary choice, the user has a different type of avatar: a snake, a tiger, or an eagle, which determines how she travels through the environment. Each avatar navigates the world from different points of view and speeds. While the snake crawls on the ground, the tiger walks, and the eagle flies, having a panoramic overview of the environment. The stone previously selected in the cave is carried by the user, and can be left on various heaps found in the virtual world. They represent the user's former presence in the virtual environment. A similar idea has already been used by Brenda Laurel and Rachel Strickland in the installation **Placeholder**. The authors, with the aid of the architect Russel Zeidler, created an icon, reminiscent of a petroglyph, that could be used to give a local habitation and a name to the simulated landscape. This icon, a schematic face, worked like a "voice holder," in which visitors to the world could leave recorded voice messages. When entering the virtual world, new users could touch the face, which would open its eyes and collect the recorded messages. In addition, **Placeholder** presented the user four choices on how to interact with the simulation: as a spider, as a crow, as a snake, or as a fish. Like in **Desertesejo**, these avatars determined the user movement in the world and also had

[22] Cf. Deleuze concept of smooth and striated in Deleuze; Guattari, 2002.

distinct voice characteristics. "Crow sounds raucous and masculine, spider wise and feminine, whereas snake and fish are gender-indeterminate" (Hayles, 1996, p. 17).

Unlike **Desertesejo**, however, **Placeholder** only allowed two participants at once. Moreover, it was a simulated virtual world, with which users interacted by means of a Head Mounted Display connected to computers. Katherine Hayles observes that, in this sense, the installation explored the materiality that interpenetrates virtuality, since when the user tried to move in the virtual world, she discovered herself tied to wires in the physical world, which would constrain her movements in the simulation (*Id.,* p. 21). Virtual online worlds, on the other hand, have been regarded as having no connection to the physical world whatsoever. If the mouse and the computer screen are material interfaces which allow us to "inhabit" the digital world, the absence of any force feedback or the absence of movement from the user contributed to the disconnection between physical and virtual spaces.

Prado takes advantage of this fact to represent a dream space, a space that is generally based on the physical world, but also has no connection to it. Compared to the idea of cyberspace as a fluid space, dreams are also imaginary spaces, which are not constrained by the laws of the physical world. On the other hand, Prado has been concerned with the material characteristics of the world.

The size of the virtual world (in kilobytes) and the download times for each room were important points when constructing the world. "Just as an example, the largest of the worlds is the one called "Gold," with approximately 20,000 polygons and 380 Kbytes, and with good level of graphic quality in the Net" (*op. cit.*). The materiality of "cyberspace" has indeed always been present. We could even risk saying that was exactly the materiality of VRML that caused its failure as a language to represent "cyberpunks' cyberspace," as Dodge said. Textures and surfaces in VRML are far away from being realistic and although some designers took advantage of this aesthetic, the majority of world architects tried to construct VRML worlds modeled after physical environments. This could only lead to frustration. Moreover, VRML required a significant plug-in application on the client side in order to display the 3D content. Cosmo Player was (and still is) the best known and best designed of these VRML browsers. The installation of Cosmo Player requires a 2 MB download. This reality placed 3D development in a hopeless situation. The content was far too expensive to develop without the assurance that the large majority of the audience would be able to view it. Yet a relatively small percentage of the Internet public felt no need to download and install a VRML browser, largely because they never became aware of content compelling enough to justify the work.

A possible reason for almost an absence of artistic multiuser environments is related to the amount of time required to participate in these environments. "Creating a community" does not mean merely designing the space; neither does it mean designing its inhabitants. Either interfaces are designed to represent an existing community (like Donath's visualizations of Newsgroups and Usenet), or there should be a compelling reason why members would gather (like playing a game, or constructing a place). Even so, participating in an online community is very time consuming. Sherry Turkle (1995) has already demonstrated this by writing about people who spend more time in these communities than outside them. Aware of the importance of social networks, but conscious that many people also do not have time to dedicate exclusively to online chatting, some artists started to explore the connection between community building and artificial life.

Although the purpose of this dissertation is exploring synchronous communication in social networks, it is also relevant to mention some projects which take advantage of the multiuser characteristic of the Internet in order to create "self-growing" communities. The game **Austropolis**, for example, formerly cited as one of the honorary mentions in Ars Electronica 2001, was a political multiuser Web-based game where avatars acted and interacted independently in their predefined environment. The author Barbara Neumayr created a Flash-based environment in which the Internet user created an avatar and gave him a specific personality and political orientation by answering several psychological and political questions. Once the user created his avatar, his virtual alter ego started living an independent life. He went to demonstrations, voted in elections, and talked to other avatars. According to Neumayr, "The avatar's actions are determined by his personality and political orientation, as well as by external influences, the user's advice and needs like hunger, thirst, boredom and so on" (Leopoldseder; Schöpf, *op. cit.,*

p. 60). Also, the avatars depended on the user's advice in order to succeed, but they didn't always do as they were told.

Austropolis was a cyber-democracy ran by avatars that made new laws, organized demonstrations, opinion polls, or plebiscites and elected a new president once a week. The ultimate goal of an avatar in this world was to make a successful career as a politician and maybe even become **Austropolis's** president. The application used to run day and night in order to simulate the life processes of its virtual inhabitants and keep the environmental model going. Therefore, whenever the user logged back in to the system, she would become aware of the latest actions of her avatar and also know how his political life had been developing.

Due to the autonomous life of its inhabitants, **Austropolis** is described as a Web-based multiuser simulation game. In the first chapter, we talked about the development of computers as simulation machines and how computers have been used to simulate and create new types of life. In this sense, Internet simulations like **Austropolis** follow the story that started with von Neumann's **cellular automata** in the 1940s, the **Game of Life** in the 1970s, and Karls Sims's **Evolved Virtual Creatures** in the 1990s. It is worthwhile to mention that in 1997 Karl Sims created the simulation **Galápagos**, named after the island visited by Charles Darwin in 1835. It is an installation composed of a projection and twelve screens, and allows participants to influence a simulation of organisms by making aesthetic decisions. In **Galápagos** one can choose among twelve computer-generated creatures displayed on screens. Then the chosen organisms mutate and reproduce, while those not selected are removed and replaced by the offspring of the survivors, which carry the "genetic" code from their parents, but are also randomly altered by the computer. Therefore, the evolution of the simulation occurs by means of interaction between human and machine. Humans have the ability to create the population, but do not influence their development. Sims's work, unlike Neumayr's, is not an online simulation, but it starts to include physical input on a computer simulation.

The Internet made possible the connection of self-evolving simulations with the input of online communities. These Internet simulations differ from previous digital simulations given that the author creates the environment and the tools, but online users create its inhabitants and from time to time "enter" the simulation in order to see how their avatars are doing. Science fiction has represented this type of environments in movies like **The Thirteenth Floor**.

A more closed, but also interesting, artistic simulation maintained by Internet users was Jane Prophet, Gordon Selley, and Rycharde Hawkes's **Technosphere**.[23] The term "closed" simulation defines a place in which users are able to create the avatars, but have no influence in their further development in the environment. **Technosphere** is an online digital environment, launched in 1995. It consisted of an offline simulation and a Web site. Through the Web site, online users could create different creatures to populate the digital world. Once created, the creatures would have an independent life in the environment. Users would receive periodical e-mails with information about the creature, but could not interfere if, by any chance, the creature was attacked by other stronger inhabitants, and eventually died. E-mails regarding one's creature's life would be like the following:

> These are the highlights of The Banker's (ID 815178) life in TechnoSphere recently:
>
> The Banker successfully defended itself from an attack by Bittron (ID 808695) who lived to fight another day.
>
> The Banker attacked Shiba (ID 812379) but it was too strong and got away.
>
> The Banker mated with destroy 2 (ID 793975) but conception didn't take place.
>
> The Banker attacked destroy 2 (ID 793975) but it was too strong and got away. (Technosphere's Web site)

Technosphere simulated a wild world inhabited by two types of artificial life forms: carnivores and herbivores. To compose each creature, one would choose among five types of heads, bodies, wheels, and eyes. The user would then give the creature a name and release it into the virtual world. Their digital DNA, or genetic specification, was linked to each chosen part, determining speed, visual perception, rate of digestion and so forth. Creatures would grow, give birth, evolve, mate and die.

The 3D world attracted over 650,000 users who created over two million creatures. One can access statistics about **Technosphere** in its Web site with the following data (without reference to a date):

- Total number of creatures alive: 198,158

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[23] Cf. http://www.cairn.demon.co.uk/technoweb.html. The Web site contains information about the piece, but the online world is no longer available. Technosphere also won a Distinction Award in the .NET category in Prix Ars Electronica 1997.

- Number of herbivores alive: 167,670
- Number of carnivores alive: 30,488
- Number of creatures that have ever lived: 2,534,714
- Age of the world: 10.31 years

Technosphere created a very interesting artistic simulation and artificial life environment. However, in the Internet version there was no real-time contact with the simulation. The development of the world could be known via e-mail, or through the Web site via 2-D snapshots of the simulation, family trees, and world statistics. In 1998, a real time 3D version of **Technosphere** was created, and it is permanently exhibited at the National Museum of Photography, Film, and TV in Bradford, UK. In the real-time version of the world creatures are shown in their context, but it is not connected to the Internet. In this sense, it is similar to Karl Sims's **Galápagos**, since the choice of avatars is not remote and these digital beings interact by themselves with the simulation. In order to inhabit both **Austropolis** and **Technosphere** the user does not need to spend much time. She just needs to take the time to construct an avatar that would evolve freely in the world. Victoria Vesna starts from the same principle, except that the online community could also modify the avatar in **N0time**.

Concerned with the amount of time spent in virtual worlds, in 2001 media artist Victoria Vesna created **n0time**,[24] which is dedicated to the amount of time that none of us have. Vesna started to realize that each of us has increasingly less time in our daily lives, specifically due to the multitasking that new technologies allow us to do. The "advantage" of being always connected and the merging of borders between work space and private space, instead of creating the promised flexibility of appointments and "saving" time, works exactly in the opposite direction. After the Internet, we found ourselves in a situation where the only time that we have is the time "in-between." In between two appointments you can make a phone call, or send an e-mail, or… participate in an online community. This fact is even stronger with nomadic technology devices, since the user literally carries the Internet with her. One of the reasons why applications for mobile and wireless technologies are becoming more popular than PC-based ones is

[24] Cf. http://notime.arts.ucla.edu.

because they can be used "in between"[25] and they also do not demand full-time dedication from the user.

In **n0time**, the user would be able to create a virtual body in a few steps, but of course wouldn't have time to care about this body. The body would then grow spontaneously in the Internet and when it achieved a certain size, it would explode, starting again. An interesting aspect of the project is exactly the concept of what a virtual body is. Vesna's previous work, **Bodies Inc.,**[26] prompted the user to create an online VRML body made out of a combination of different types of heads, torsos, arms, and legs, with customizable textures, sizes, genders, and sounds. It was a very human-like avatar. **n0time** deconstructs this anthropomorphic avatar into a tetrahedron composed of mems and intervals. The idea behind the new virtual body is the same as the one behind construction of online spaces: Why mimic the physical body if the virtual body could assume any form?

The **n0time** body was built from six intervals, each one with a corresponding color, sound, and basic meaning. For example, red corresponded to family, orange to finances, yellow to creativity, and so on. The length of these intervals was chosen by the user and influenced the evolution of the body as it started replicating. Then for each connection of intervals, the user chose a meme, which consisted of relevant words. Once the body was created, it started to replicate. Although the owner presence was no longer required for the body replication, she could eventually log in the Web site to see the evolving body or chat with people from the community.

In addition, **n0time** was not only an "online community." It has been shown as a physical installation in several places, including the San Francisco Art Institute, the Oklahoma Museum of Art, and the Atlanta College of Art and Design. The installation explored the interaction of digital and physical spaces by having visitors to the museums influence and modify the virtual bodies. Visitors who spent the time walking through the installation space generated the replication of the body intervals. Memes could then be added to the body, but only by those invited by the owners. The invitations could be made via e-mail and memes could be placed online or in the installation spot.

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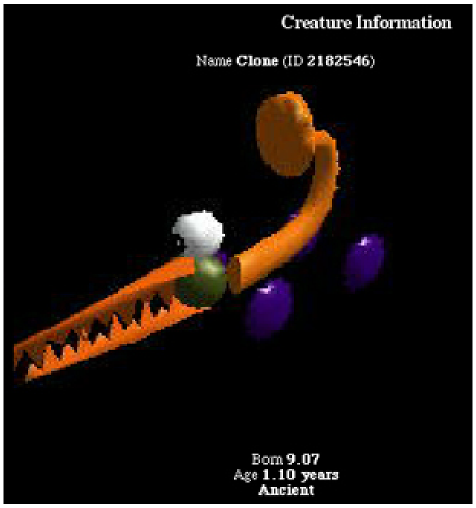
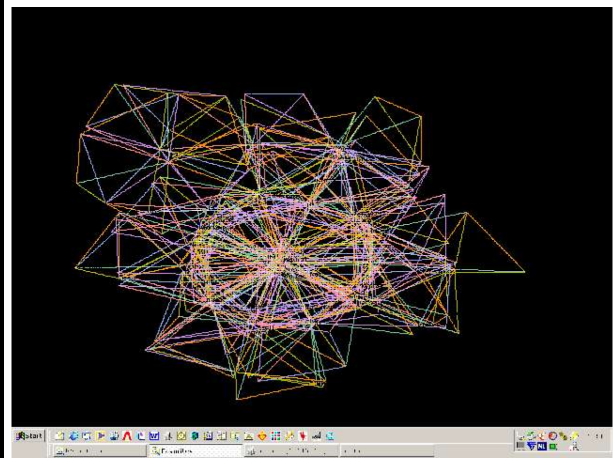
[25] For example, while waiting for the bus or stuck in a traffic jam.
[26] Cf. http://bodiesinc.ucla.edu.





Pictures 18 and 19: Technosphere creature and the author's body in **n0time**.

n0time is an example of how virtual spaces could merge with physical spaces, a tendency that just grows with the emergence of nomadic technology devices. In a superficial overview, we have the impression that this is a new trend. The Internet has become so strong in our society that there is almost a cultural amnesia about telecommunications-based art that pre-dates the Web and already explored these issues. However, there are many artistic explorations on the interconnection between physical and virtual spaces that used telecommunication technologies like satellites and video cameras since the beginning of the 1970s. Most of these works, which generally included performances and networks with the aim of showing that geographical distances could be suppressed via technology, anticipated social interactions taking place on the WWW in the 1990s. The main difference between artistic explorations of communication on the Net and telepresence works is that the former ones should necessarily take place in "cyberspace" whereas the last ones happened in physical space. In all of these works, the idea has always been to bring the distant closer, and to interact with distant entities *as if they were here*. The aim of telepresence is to create a communication network that can be called *virtual* because it occurs in no specific place, somewhere in between here and there.

4.2. Telepresence and virtual spaces

Artists like Kit Galloway and Sherrie Rabinowitz, Douglas Davis, Keith Sonnier, and Roy Ascott, among others, are considered pioneers in the exploration of telepresence art. Lars Rosenberg (*Apud* Wilson, 2002, p. 527) in the journal Telepresence defines the term in contrast to virtual reality: "Very similar to virtual reality, in which we strive to achieve the illusion of presence within a computer simulation, telepresence strives to achieve the illusion of presence at a remote location." In this sense, telepresence has the ability to change one's perception of space: not the distant virtual space, but the physical space which one inhabits.

We can distinguish telepresence from its correlates telematics and telerobotics by arguing that telepresence uses telecommunication technologies in general, like telephones, satellites, or videophones to achieve the sensation of presence at distance. Stephen Wilson (2002, p. 526) points out that "some earlier observers of the telephone were so unnerved by the unnatural presence afforded by the disembodied voice that they ran frightened from the room." In this sense, the term telepresence precedes digital technologies and computer networks. Telematics merges telepresence with computers and has been a great field for artistic exploration after the emergence of the Web. The term itself was coined in 1978, and Roy Ascott was the first theorist to apply the term *telematic* to art in 1979. Finally telerobotics merges telematics and robots or robotic structures, and it happens whenever one can be present by embodying a robot. The most famous example is Ken Goldberg's **Telegarden** (1995), which consisted of a robotic structure that users could manipulate through the Internet in order to plant seeds and water plants in a mini-garden.

Telecommunications technologies have already been artistically explored in order to construct social networks, merging physical and virtual spaces, long before the phenomenon of nomadic technologies. The utopia of creating "new worlds" in the Internet temporarily overshadowed these experiments. Yet mobile technology devices are responsible for creating a hybrid space that overlays the digital on the physical by means of *mobility*.

Steve Dietz (2001), curator of the itinerant show **Telematic Connections** that took place in 2001,[27] suggests that the first telepresence instrument was the synchronous telegraph created by the Greek Aeneas around the year 350 A.D. Later, the modern telegraph was able to transmit messages at a distance, greatly speeding up information transmission time. It was the first advanced telecommunication technology that drastically altered people's perception of time and space. In a banquet held for Samuel Morse, one of the inventors of the electric telegraph, at Delmonico's in New York in December 1868, he was toasted for having "annihilated both space and time in the transmission of intelligence" (Standage, 1999, p. 90).

4.2.1. On some early experiments on telephone-based art

After the telegraph came the telephone, and after the telephone, the television, satellites, fax machines, video cameras, and videophones. Very early on, some artists started to use telecommunication media to develop projects. Considered one of the first to create a telepresence piece, Lázlo Moholy Nagy experimented using the telephone to transmit directions for fabricating enamel tile paintings. He wrote:

> In 1922 I ordered by telephone from a sign factory five paintings in porcelain enamel. I had the factory's color chart before me and I sketched my paintings on graph paper. At the other end of the telephone the factory supervisor had the same kind of paper, divided into squares. He took down the dictated shapes in the correct position. (It was like playing chess by correspondence.) One of the pictures was delivered in three different sizes, so that I could study the subtle differences in the color relations caused by the enlargement and reduction.[28] (Moholy-Nagy *apud* Kac, 1992)

Eduardo Kac suggests that nobody knows whether Moholy-Nagy's story is true or not, because his wife stated that in fact she ordered the paintings in person. However, this description is important because it produced the idea that the modern artist can be subjectively distant, and personally removed from the work.

Nevertheless, Stephen Wilson (2002, p. 489) argues that the telephone has never been used by artists with much enthusiasm. One of the reasons for this lack of excitement

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[27] Available at: http://telematic.walkerart.org/. Accessed on: 12 Jan. 2004.
[28] KAC, Eduardo. Aspects of the Aesthetics of Telecommunications. In: **Siggraph Visual Proceedings**, John Grimes and Gray Lorig, Editors (New York: ACM, 1992), p. 47-57. Available at: http://www.ekac.org/Telecom.Paper.Siggrap.html. Accessed on: 12 Jan. 2004.

might arise from the fact that the telephone has always been regarded as a “low technology,” since it lacked images. As traditional artistic practices have always been primarily visual, a medium that allowed merely the transmission of voice would, probably, lose something. Later with the emergence of television and video, the telephone was quickly forgotten as an artistic tool. Even before, the radio offered the possibility of broadcast, while the telephone was regarded as merely a two-way medium.

Wilson *(Id.)* argues that “given the symbolic and cultural richness of the telephone, it is strange that artists have not done more with the technology.” Partially this might have occurred because artists could not envision the power of the telephone as a new aesthetic technology. An example of this situation occurred in 1969 when the Museum of Contemporary Art in Chicago organized an exhibition called **Art by Telephone.** Much like Moholy-Nagy’s experiment, 36 artists were asked to place a phone call to the museum and to instruct museum staff about what their contribution to the show would be. The museum then produced the pieces and displayed them. Testing the possibilities of a remote-controlled creation can be considered the first use of telephones in order to produce art. However, the telephone as a new technology had not been explored as a creative medium, and had only been used as a remote interface to accomplish something that could be done, for example, if the artist had to go to the museum and talk to the curator. Ultimately, **Art by Telephone** was not considered a telecommunications art event. Kac (1992) tells that one of the few creative uses of the technology in the exhibition has been accomplished by Robert Huot. The artist

> potentially involved all visitors of the museum and attempted to generate unexpected first meetings by employing chance and anonymity. Twenty-six cities in America were chosen, each starting with a letter of the alphabet, and twenty-six men named Arthur were selected, one in each city. Each Arthur's last name was the first listing under the initial letter of the city (Arthur Bacon, in Baltimore, for instance). The Museum displayed a list of all cities and names, and invited visitors to call and ask for “Art.” The work was the unexpected conversation between “Art” and the visitor, and its development totally up to them.

In summary, Huot’s piece presents the artist as the creator of a context, and it is not a passive experience for the visitor.

More recent pieces that employ the telephone include the works developed by the Disembodied Art Gallery,[29] a British Group that explores conceptual and telecommunication-based art. For instance, in December 1996 they created **The Answering-Machine Solution C.D.**, a large collection of 30-second tracks that could be used as answering machine messages. From the same group, **Babble**, was a telematic-art installation created in 1993 that received over 70 voice contributions from the United States, Australia, Japan, and Europe. Callers telephoned a U.K. number and could record poetry, stories, and thoughts on an answering machine. Then these messages were collected and replayed automatically to visitors of a Bringhton gallery whenever a member of the public entered the installation room. **Temporary Line** (1993/94), another piece of the Disembodied Art Gallery, was an audio-reactive telephone sculpture. This piece was activated whenever a member of the public walked close to the sculpture. When activated, the sound of whispering voices would dart around the sculpture, from telephone handset to telephone handset, at random around the feet of the visitor.

The common idea behind most of these projects is not so much to explore synchronous communication, but to investigate the use of a recorded presence or voice as a past presence. This idea, as we saw, has been used in Brenda Laurel's **Placeholder**, when a virtual answering machine enabled users to record their messages and access former users' messages, and also metaphorically by Gilbertto Prado in **Desertesejo**, by means of a rock that could be placed in the environment. Voice has become synonymous with presence with the emergence of the telephone, but this audible presence was replaced by images as soon as the television arrived. However, television is a broadcast medium and does not allow two-way communication.

The development of videophones tried to combine the instantaneous two-way communication that belonged to the telephone with the images that belonged to the TV. The failure of the videophones, however, is paradoxically connected to what was considered their advantage: the use of images. Gilbertto Prado[30] suggests that the videophones did not become integrated into everyday life because they required too much aesthetic preparation from the user. Because the device transmitted not only voice, but

[29] Cf. http://www.dismbody.demon.co.uk/home.html
[30] Interview to the author. (22 Mar. 2003)

also images, people were compelled to care about how they would appear to the other party. The aesthetic concern was not only restricted to people, but also influenced the construction of space around the device. As a consequence, specially decorated rooms were created to accommodate the videophone and prevent the user from being taken by surprise, when he was not, for example, properly dressed. Prado also suggests that as the Internet legitimated distance of the physical subject, because users were represented as avatars, many people felt more comfortable maintaining contact with unknown partners. Today this paradigm is changing. We can see the growing use of Webcams in Internet chats, and also the use of cameras on cell phones that allow the instantaneous transmission of videos and still pictures. Will the familiarity with this technology change the relationship between interpersonal communication and the transmission of images?

Paradoxically, exactly because of the absence of images, the telephone has emerged as the ultimate virtual and disembodied medium. According to Stephen Wilson (2002, p. 489),

> The eradication of distance between voices is also the raison d'être of the telephone; it is the attempt to install an anechoic vacuum, a space of no distance, an absolute space which bodies, being voluminous things, cannot occupy, but through disembodied voices can travel.

From this perspective, the telephone is also a very important virtual medium. Nevertheless, the first artworks that used telephones were almost all restricted to calling another party, phone ringing, and recording voice messages. A member of the Disembodied Art Gallery, Heath Bunting, is another artist who develops telephone-based works. For example, the **Kings Cross Phone-in** was a piece in 1994 in which he distributed numbers of the telephone kiosks around Kings Cross British Rail station using the Internet and asked whoever found them to choose a number and call it at a specific time and chat with whoever picked up the phone. The incident was a resounding success and at 6 p.m. one August afternoon the station "was transformed into a massive techno crowd dancing to the sound of ringing phones," according to Bunting.

Also Ian Pollock and Janet Silk have created telephone-based works for many years. They worked mainly with voice mail and pay phones. Among their works, **Local 411** (1997) used pay phones to reintroduce ideas about persons displaced in an urban renewal project that became home to museums, concert halls, and upscale hotels and restaurants. Visitors could call special numbers to hear stories of the displaced. Stephen

Wilson also created a telephone-based project called **Is Anyone There?** (1992) during one week in San Francisco. In the project, five ringing pay phones on the streets connected to a computer telemarketing device made hourly calls with the aim of involving whoever answered the call in a conversation about life in the city. The conversations were then digitally stored and accessible through an installation which included a database of these recorded calls. Wilson's aim was to analyze dialogs between computers and humans, much like what has been common with some chat bots like Eliza or Julia, who blur the borders between what it is to be human and what it is to be a machine.

If there is almost a lack of interest from artists regarding the use of telephones in artworks, the same is not true concerning satellites and video as telepresence media. There is an extensive story about the artistic use of these devices since the 197's. Such works can be viewed as the first attempts to create a hybrid space long before the cell phone.

4.2.2. Video, satellites, and telepresence

The year of 1977 was crucial for telepresence arts. This year the **Documenta 6**[31] art show in Kassel, Germany, featured the first live international telecast by artists. Performances by Nam June Paik, Joseph Beuys, and Douglas Davis were transmitted to over 25 countries via satellite. While Paik and Joseph Beuys performed from Kassel, Douglas Davis streamed live from Caracas, Venezuela. The piece **The Last Nine Minutes**, re-edited for the exhibition **Banquete**[32] at the ZKM[33] in Karlsruhe (Germany, 2003), dealt with the parameters of media communication and the idea of telepresence, in which he explored the concept of *distance*. In the same year, a collaboration between artists Keith Sonnier and Liza Bear, in New York and San Francisco, resulted in **Send/Receive Satellite Network: Phase II**, a fifteen-hour, two-way, interactive satellite transmission between the two cities.

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[31] Cf. http://www.eai.org/eai/tape.jsp?itemID=2723

[32] Available at: http://www.banquete.org. Accessed on: 27 Jan. 2004.

[33] *Zentrum Für Kunst und Medientechnologie* (Center for Art and Media Technology).

Also in 1977, Kit Galloway and Sherrie Rabinowitz organized an interactive dance via satellite involving performers on the Atlantic and Pacific coasts of the U.S. **Satellite Arts Project**,[34] according to the authors, was "a space with no geographical boundaries."[35] With this piece, artists started to define the concept of *the image as a place*, demonstrating, for the first time, that several performing artists could appear and perform together in the same image, even if they were not in the same physical place. From these initiatives we can perceive that the wish, and the accomplishment, of having people meet in the same "virtual" place is older than the WWW experience.

Three years later the same artists developed **Hole in Space,**[36] also utilizing satellite technology. One life-size video projection screen was placed in New York, while the other was located in Los Angeles, both in the middle of the street. As the New York screen projected Los Angeles and the Los Angeles's screen showed New York, they functioned as "windows" or "holes" to the opposed city. It is interesting to watch the documentation video of the piece showing passersby simultaneously amazed and incredulous about the screens. At that time, no signs, sponsor logos, or credits were posted, and many people thought that what they could see was a fake image or a recorded video. They did not believe they were seeing the other city in real-time. On the other hand, people started to perceive that the installation could be a powerful communication tool in real-time between both cities. In the documentation video we can observe people waving at each other, making contacts, and developing a "network through the virtual space created by the satellites."[37] Ultimately, the piece became a very strong communication device between the two cities, besides changing the perception of the physical space in which citizens were used to passing by every day. The addition of another "layer of space" changed the characteristics of the public space of both cities for three days, transforming the circulation space of the street to a gathering and communication place.

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[34] Available at: http://www.ecafe.com/getty/SA/index.html. Accessed on: 17 Dec. 2003.
[35] *Id.*
[36] Available at: http://www.ecafe.com/getty/HIS/index.html. Accessed on: 27 Jan. 2004.
[37] *Id.*

Picture 20: Documentation video of **Hole in Space** in the ZKM museum (Germany, 2003). One side of the wall represents New York, and the other side, Los Angeles.

Galloway and Rabinowitz focused on creating mobile networks when developing telecommunications artwork. With **Satellite Arts Project** and **Hole in Space**, they aimed to connect people over large distances using current telecommunications technology. **Hole in Space**, for example, created a virtual space in which communication would occur. However, differently from Internet chats or multiuser environments, Galloway and Rabinowitz's intervention happened in public space. Placing one screen in Los Angeles and another one in New York, people would gather on the streets to see and contact other people across the screen. In this case, 'the other side of the screen' was not a virtual simulated environment, but another city, a physical space. While these people would not be sharing the same contiguous physical space, communication between them was happening in urban spaces and directly influencing all other passersby. Galloway and Rabinowitz claim that they have always been interested in creating a communication context by connecting physical spaces, rather than creating a simulated world in which communication could occur, as is the case with the Internet.[38]

Later in the 1980s the artists also experimented with 3D virtual worlds,[39] but according to them nothing is more powerful than connecting people in physical spaces. The fact that people experiencing **Hole in Space** were not sharing the same contiguous

[38] Talk in the Electronic Café at Santa Monica, Los Angeles (15 Nov. 2003).
[39] The virtual Electronic Café was one of the first "places" in the multiuser environment Alpha Worlds.

space creates a mixed communication environment, which merges physical spaces and a virtual non-place where the communication exchange happens. **Hole in Space** is significant, among other reasons, because it foresaw more than twenty years ago the power of mediated communication in public spaces.

Another important project from the beginning of the 1990s is Paul Sermon's **Telematic Dreaming**. In 1992 the artist created a "virtual bed" that could be shared by people that were not actually in the same physical space. Actually there were two beds and an image of a distant person projected onto the nearby bed. **Telematic Dreaming** used an ISDN digital telephone network to connect separated interfaces, which functioned as video-conferencing systems. One of the beds was located in a dark space, while the other was placed in a illuminated space. The bed in the light location had a camera situated right above it, which sendt the live video image from a person that laid on the bed across the network and projected it on the dark bed. There was the impression that that one was right beside the physical person lying on the dark bed. There was still a second camera in the dark bed room that captured the virtual image of the two people on the bed and sent it to the series of monitors that surrounded the installation. When one watched the TVs, it seemed that the two people were actually sharing the same space. According to Sermon, "The ability to exist outside of the users own space and time is created by an alarmingly real sense of touch that is enhanced by the context of the bed and caused by an acute shift of senses in the telematic space."[40]

In the next year Sermon transferred the bed to a sofa, creating **Telematic Vision**. The technology was the same, but instead of sharing a bed, participants would share a living room. One person would sit on a sofa in front of a TV. The TV then showed an image of the sofa in which the participant was seated, with the difference that there was somebody else sharing the sofa with her. This somebody else was a remote person, seated on a distant sofa, whose image was transmitted via a telephone network. This person ended up occupying the same living room and watching the same doubled image on the TV.

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[40] SERMON, Paul. Telematic Dreaming Statement. Available at: http://www.artdes.salford.ac.uk/sermon/dream/dream.html. Accessed on: 01 Sep. 2003.

Most telepresence projects utilizing video and satellites differ from telephone-based projects due to the transparency of the interface. In telephon- based works, the interface telephone was generally completely visible, and sometimes the final meaning of the piece, as is the case with works which explore ringing tones, and pay phones. On the other hand, video streaming and satellites are mostly used to transmit images, and images overtake people's attention, hiding the interface. Both in **Hole in Space** and in **Telematic Dreamings**, for example, participants were not concerned, at a first, with what type of technology had been used to project the images. The effect of an L.A. window on a New York street, or the sight of another virtual person in your bed used to hide what was "behind the image." Today, with wearable technology and cell phones (also considered a wearable device), telephones become simultaneously ubiquitous technologies and transparent interfaces. This happens mainly because the telephone transformed into a portable device, what was not the case twenty years Aug.

Another reason why telephones had not been widely explored as art might be connected with the fact that this technology has always been related to one-to-one communication. Artworks reflect this, only employing telephones in order to place and receive calls. Perhaps that is also why it has been more interesting to work with satellites and video, for they allowed communication among several people simultaneously (e.g. **Hole in Space**). Right now this scenario changes, not only because of teleconferencing capabilities, but because cell phones, due to mobility, are becoming social/community devices.[41]

Considering the state of the interface in the beginning of the 1980s, Söke Dinkla observes that the situation could be characterized by the catchwords "Participation versus Interaction" (Dinkla, 1994). She defines participatory environments as physical installations developed inside responsive environments. Responsive environments are basically defined spaces, which by means of sensors and other interfaces such as video cameras respond to the user's actions. Paul Sermon's pieces are responsive environments, as well as Myron Krueger's **Videoplace** (1974) and David Rokeby's **Very Nervous System** (1986/90). On the other hand, interactive environments started to be developed

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[41] Some uses related to this feature are going to be analyzed in the next part of this dissertation, in the chapter **Cell phones and places** and in the chapter related to location-based mobile games.

with the use of Head Mounted Displays, creating a situation that isolated the user in a virtual space, through which she could move and with which she was able to interact. Therefore, the term *movement* no longer signified movement of the performer in space, like in physical responsive environments, but the movement of the image caused by the joystick, or the mouse. In this sense, the movement of the spectator was substituted with the movement of the image.

Interaction was dominant over the 1990s, due to the large development of virtual reality systems that aimed to withdraw users from physical spaces and place them inside modeled environments. In the beginning of the 21st century, however, we observe a return to physical spaces. Nevertheless, unlike responsive environments, in which there was a delimited portion of space in which the action would occur, the emergence of nomadic technology devices allows the whole space to be used as the “responsive surface.” It is as though the urban space has become a map of itself, a place for interaction and long-distance contact, without the need of a restricted space.

In the virtual world **Imateriais**, one of the creators’ goals was to show visitors that the virtual was progressively being assimilated into everyday life. That means, according to them, that “increasingly everyday life events take place in the virtual world.”[42] Four years later, in 2003, the same phrase can be used with an opposed meaning: The virtual is being progressively assimilated into everyday life because virtual merges with physical, enhancing communication and action in physical space. And the main reason for this fact is the development of nomadic technology devices.

[42] Imateriais em meio virtual. CD-ROM **Imateriais** (1999). *“Parte cada vez maior dos eventos cotidianos dá-se no mundo virtual.”*

PART II: (Hybrid) spaces as multiuser environments

> "It is a journey into a largely unexplored terrain, which does not exist as physical space—or for that matter as a virtual, simulated space—but rather as an invisible and intangible electronic presence. Yet it is not unlike the built environment which has existed all around us for hundreds of years. It has structure and a spatial quality made up of a system of networks and cells, and, in many ways, it is a space which has its own vitality—an organism which is the sum of all the interactions and interconnections taking place within it—much like the living, breathing community which makes up our own cities." (Catterall, In: Raby *et al*., 2000)

5. DEFINING HYBRID: FROM PLACES TO SPACES AND BACK TO HYBRID

A hybrid space is defined by the merging or the blurring of borders between physical and virtual spaces. Hybrid spaces are nomadic spaces, created by the constant mobility of users who carry portable devices continuously connected to the Internet, and to other users. A hybrid space is conceptually different from mixed reality, augmented reality, augmented virtuality, or virtual reality. The possibility of "always on" connection when one moves through the city transforms our experience of space. This connection is related both to social interactions, as well as to connections to the information space, that is, the Internet. This chapter defines hybrid reality in the light of the passage from static to mobile interfaces, also known as nomadic technology devices. In other words, it goes from cyberspace to hybrid spaces.

Three points are important to be considered when conceptualizing this new spatial perception. First we need to rethink the concept of virtual. As I argued in chapter 2, the term *virtual reality* has mainly taken advantage of an inversion of the Platonic concept that viewed the physical reality as an "inferior" representation of an ideal world. Virtual reality environments have been modeled after physical reality. However, digital worlds are modeled by numbers, and therefore do not have an original in the physical world.[1] They become, thus, simulacra, copies without originals, which, according to Jean Baudrillard (1994, p. 1-42), can be dangerously regarded as hyperrealities, or realities

[1] Following the classical representation logic defined by Edmond Couchot. (Cf. Couchot, 1996, p. 39)

better than reality itself. Differently, the virtual contained within the hybrid is basically part of the real, or paraphrasing Gilles Deleuze, (1994, p. 209) corresponds to potential realities always ready to emerge. Therefore, the virtual becomes the real itself, and physicality, one of the manifestations of the virtual. As the virtual is not (and has never been) restricted to the Internet, we can also perceive virtual connections in telephonic conversations: telepresence connections. The virtual, in this sense, approaches Michel Serres's (1997, p. 145) idea of a thing which is not here, or which happens in an undefined place. The possibility of moving through physical space, interacting with other people while in movement, promotes the enfolding of distant contexts into the present context. According to N. Katherine Hayles, "the context is becoming enfolded, so that there is no longer a homogeneous context for a given spatial area, but rather pockets of different contexts in it."[2] For example, someone talking on a cell phone is part of the context of people who share the same spatial area, but she is also part of a distant context, because she is talking to someone who is spatially remote from her area. Hence there is a context that is created by the spatial proximity of people and inside it another context that is created by the cell phone. This might have been a feature of other media as well, such as the TV or wired telephones. The difference promoted by nomadic technologies, however, is precisely *the possibility of moving through space*. When compared to the fixed Internet, mobile devices bring actions formerly performed at specific "private" places (home or offices with desktop computers connected to the network) to public urban spaces. Sending e-mails, accessing one's bank account, or checking the weather can now be accomplished from anywhere. Furthermore, these technologies create another perception of what it means to access the Internet. As I shall argue in chapter 7, **Cell phones and places**, teenagers in Japan do not feel like they are "entering the Internet" when they use their I-modes[3] with always-on connection. The mobile Internet (or no matter how this information network is named in the future) is becoming useful for actions that integrate the Web and physical spaces.[4]

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[2] In an interview to the author (Nov. 19, 2002).
[3] I-mode is a "data service launched in Japan by NTT DoCoMo as a layer over the cellular system PDC. It includes several multimedia services." Source: Teleco <http://www.teleco.com.br/glossario.asp?termo=I-mode>. Accessed on: 17 May 2004.
[4] A simple example is buying a soda in a vending machine in Finland.

The idea of cyberspace as another space to inhabit, or a place that requires detachment from physical space to be accessed, no longer applies. Japanese teenagers are always both on the Internet and outside it. Moreover, the concept of cyberspace is already outdated to describe the Internet. It is also possible to apply the idea of enfolded contexts to the mobile Internet. Ultimately, from now I shall no longer distinguish in a strict way communication that takes place via (mobile) Internet, via voice, or via SMS (Short Message Service), since all these actions can be performed with the use of the same device: a cell phone. My aim is to study how mobile technology devices change our ways of interacting with each other by creating a hybrid space that merges the physical and the virtual, voice and Internet, sound and images.

The second important point considering changes in our experience of space promoted by nomadic devices is related to the history of advanced transportation and communication technologies. These technologies have been responsible for compressing time and space, while speeding up communication and mobility around the globe. However, the emergence of advanced transportation technologies, like the railroad, was responsible for disconnecting communication and transportation. Due to the high speed, the train traveler did not feel connected to the outside world. The train created a closed traveling space inside physical space that was disconnected from the landscape around it. The emergence of mobile technology devices reconnected transportation and communication, since it is possible to carry the communication technology close to the body.

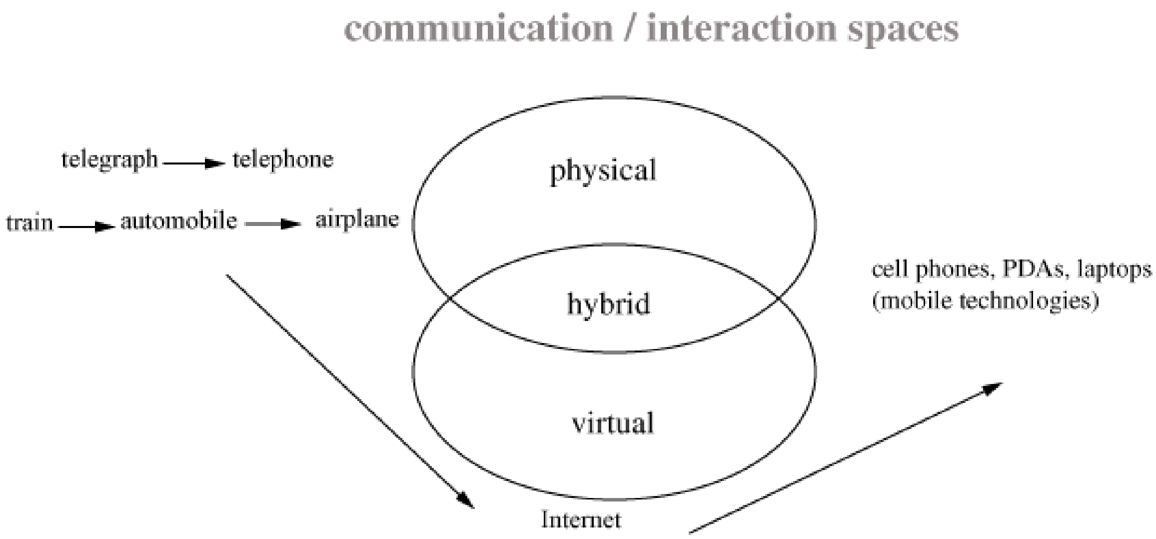
Finally, a hybrid space is produced when virtual "places" migrate to hybrid spaces. With advanced transportation and communication technologies, cities have become circulation spaces, and gathering places moved partially to the Internet, inside which multiuser environments have been regarded as utopian places of liberty. Now mobile devices bring these "multiuser environments" back to physical spaces, transforming the way we experiment with urban spaces. In chapter 8, I will analyze how media arts (art mediated by technology) is responsible for creating hybrid spaces and transforming cities and museum spaces into communication and participatory places. Foregrounding the pathway from the virtual to the hybrid does not mean that urban spaces are no longer circulation spaces. Cities are still processes,[5] but now circulation spaces include communication. A hybrid space is not defined by physical borders; although it is a communication *place*. It is as if we extend the idea of the city as an economic process, as defined by Manuel Castells (2000, p. 417), to the city as a communication process. Kevin Kelly (1999) foresaw that “people will inhabit places, but increasingly the economy inhabits space.” Now we see that people also inhabit spaces: not the virtual space of information that constituted the Internet, but the hybrid space of cities.

This second part of this dissertation is dedicated to the definition of hybrid spaces by means of art and games (or the combination of both). I focus on how nomadic technology devices change our experience of urban spaces and define new places for the imaginary. Gathering places/communities that formerly existed only on the Internet now happen in hybrid space. The passage from the virtual to the hybrid reterritorializes[6] multiuser environments in hybrid spaces. Multiuser environments have been defined as social places, as well as places that allow communication among people who do not share the same physical space, allowing them to meet in virtual spaces, and to inhabit the same virtual space even if they are not actually talking to each other.[7] This idea, which is not exclusively related to the Internet, can be easily transferred to physical space when we take a closer look, for example, at the development of location-based mobile games, or pervasive games.

This chapter begins by conceptualizing hybrid reality in opposition to virtual, augmented, and mixed reality. Then it defines nomadic spaces in connection to the use of nomadic technology devices, foregrounding how imaginary spaces are transformed when we move from the idea of the traveler to the idea of the nomad. Finally, it addresses the transformation from places to spaces, and then to hybrid spaces. The transition from places to spaces is connected to the development of advanced transportation technologies and finally to the Internet, while the emergence of the hybrid space is related to nomadic

[5] According to Manuel Castells concept of *space of flows* (Castells, 2000, p. 407). See chapter 2 for further details.
[6] Concept defined by Deleuze and Guattari in **A Thousand Plateaux**. (Deleuze; Guattari, 2002)
[7] See chapter 3, **Multiuser environments as (virtual) spaces** for more information on MUDs.

technology devices. The following graphic represents a summary of the idea that has just been presented:



Picture 21: Communication/interaction spaces.

5.1. Hybrid reality vs. virtual, augmented, and mixed realities

Frequently the virtual has been considered opposed to the physical, mainly because cyberspace has often been viewed as an immaterial space. A hybrid space occurs when one no longer needs to go out of physical space to get in touch with virtual (digital or potential) realities. Hybrid spaces have three main characteristics: (1) the merging of borders between physical and virtual spaces, (2) the use of nomadic and pervasive technologies as interfaces, and (3) mobility and communication in public spaces. Hybrid spaces fold the virtual as potential into the nearby physical space, blurring the borderlands where the virtual transforms into the actual, and the actual fades back into the virtual. There is a dynamic interplay whereby the virtual becomes actualized and the actual becomes, once again, virtual. In this sense, the hybrid space is different from the augmented reality that superimposes graphic or sound information onto a view of the real world, and from the augmented virtuality that refers to “augmenting or enhancing the virtual world produced by a computer with data from the real world” (Ohta; Tamura, 1999, p. 2). Hybrid spaces are also unlike mixed reality as described by Paul Milgram and Herman Colquhoun (Milgram; Colquhoun, In: Ohta; Tamura, *op. cit.,* p. 10). Milgram and Colquhoun suggest that the mixed reality occurs when “it is not obvious whether the primary environment is real or virtual,” creating an RV (real-virtual) *continuum*. Hybrid reality, by contrast, does not oppose the real and the virtual; it includes the virtual inside the scope of the real. The concept is also related to mobility and movement in physical space rather than to computer-modeled environments.

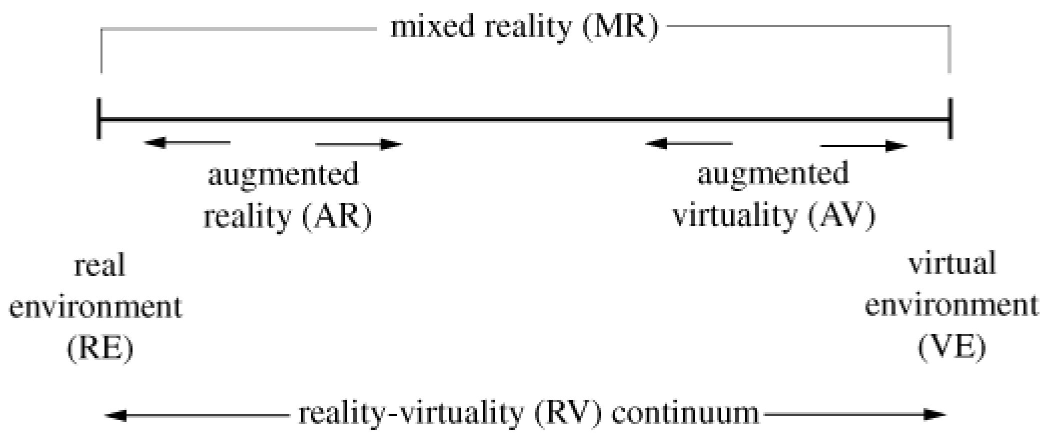
In contrast with this view, virtual spaces have usually been related to static interfaces used to connect to the Internet, such as desktop computers, large monitors, and corded mice. One needed to “enter” the Internet in order to “inhabit” a virtual space, by implication temporarily leaving physical space behind. Now nomadic technologies, smaller interfaces, and wireless sensors are embedding this virtual reality in public spaces, not because one is able to connect to the Internet while in movement, but because these interfaces redefine reality, promoting the emergence of possible and distant realities within the nearby context. The disconnection between virtual and physical spaces contributed to the definition of the concepts of virtual and physical as opposed to each other. In newer hybrid realities, the virtual is conceived not as opposed to physical, but as a potentiality already present in the physical. In this sense, the virtual represents a broader aspect of reality.

Milgram and Colquhoun (In: Ohta; Tamura, *op. cit.,* p. 6) point out that current literature on augmented reality defines it in three distinct ways, depending on the technology used. First, the traditional augmented reality is achieved by means of some kind of Head Mounted Display (HMD) or Head Up Display (HUD) with see-through capabilities, in a way that the user can see the “real” world with overlaid graphical data. Originally, these types of displays have been used in military aviation environments. Broadening this concept, the second use of augmented reality refers to “any case in which an otherwise real environment is ‘augmented’ by means of virtual (computer graphic) objects” *(Id.).* Examples of this use include applications in robotics and medicine. Finally, Milgram and Colquhoun suggest a third class of AR which encompasses the cases involving any mixture of real and virtual environments.

Two aspects should be taken into consideration in this definition. First, it opposes the real and the virtual, although it is possible to go from one extreme to another in a VR continuum. Second, Milgram and Colquhoun define “real” as what we can see from the physical world, and “virtual” as computer-modeled environments. Finally, the author suggests that the first and the second trends can definitely be called augmented reality, while a broader term must be defined for the third trend.

Therefore, Milgram and Colquhoun (In: Ohta; Tamura, *op. cit.,* p. 7) proposes a line representing a VR continuum. On one side there is the virtual environment, which is a completely computer-modeled world. On the other side there is the real environment, which represents an unmodeled world. The authors argue that there is no opposition between the virtual and the real because between the modeled and the unmodeled worlds there are several levels of reality, from augmented reality (an enhanced reality with virtual elements) to augmented virtuality (an enhanced virtuality with elements from the real world) *(Id.).* Milgram and Colquhoun (*Ibid.,* p. 8) restrict their definition to graphic information; thus elements from the real world inside modeled environments correspond to photographs, while elements from virtual realities inside unmodeled environments correspond to computer-generated images overlaid on photographs, for example.

Ultimately, the main problem in defining augmented reality or augmented virtuality depends on determining which is the original enhanced environment. This decision, apparently simple in the beginning, can be extremely dubious, since it is not always clear whether the primary environment is modeled or unmodeled. Consequently, Milgram and Colquhoun create the term *mixed reality* to define situations in which it is not clear whether the primary environment is “real” or “virtual,” or when there is no predominance of “real” or “virtual” elements in the environment. The following illustration helps us to understand Milgram and Colquhoun’s idea:



Picture 22: Definition of *mixed reality* within the context of the RV Continuum, according to Paul Milgram and Herman Colquhoun.

The terms augmented and mixed reality, however, are generally used as synonymous. Ivan Poupyrev[8] (2000), from the ATR Media Integration & Communications Research Laboratories in Japan, defines research on augmented *or* mixed reality as aiming "to develop technologies that allow mixing or overlapping of computer generated 2-D or 3D virtual objects on the physical world." Furthermore, in these definitions, the physical is generally described as the *real*.

A different approach toward the definition of mixed reality is endorsed by Hiroshi Ishii (1999, p. 232), from the Tangible Media Group at the MIT Media Lab. Ishii foresees desktop computation changing into two major directions: onto our skin / bodies, and onto the physical environments we inhabit. Whereas the first trend is connected to the definition of wearable computing, the second is related to ubiquitous computing. Ishii's group attempts to "bridge the gap between cyberspace and physical environment by making digital information (bits) tangible" (*Id.,* p. 233). In this sense, he dedicates considerable importance to material interfaces, focusing on how to bring the "immaterial" bits of virtual spaces into the physical world.

Lev Manovich (2002, p. 1-2) recently stated that the 1990s were about the virtual, and that it is quite possible that this decade of the 2000s will turn out to be about the

[8] Augmented and Mixed Reality. **ATR media integration & communications research laboratories,** Japan. Last actualization on: 24 Apr. 2000. Available at: http://www.mic.atr.co.jp/~poup/research/ar/index.html. Accessed on: 07 Sep. 2003.

physical. He defines three types of applications that create an *augmented space*. The first one is video surveillance, which captures data from the physical environment and adds it to the digital network. The second, cellspace, inverts this situation by sending data to mobile users in physical space carrying GPS devices and cell phones. Similarly, but in a non-personalized approach, computer monitors and video displays on public places can present visible digital information to passersby. Manovich (*Ibid.,* p. 4) defines augmented space as a physical space transformed into a dataspace: "extracting data from it (surveillance) or augmenting it with data (cellspace, computer displays)." Therefore, the flows of information that previously occurred in cyberspace can now be perceived as flowing into and out of physical space. Included in this augmented space are all types of ubiquitous computing, augmented reality, tangible interfaces, wearable computers, in a total of fourteen items, to exemplify the mixture of virtual and physical spaces. Manovich (*Ibid.,* p. 7) does not oppose virtual and augmented reality. The author argues that one can think about immersion in the virtual or augmentation of the physical depending on the relative size of the display.

There are several experiments trying to combine augmented reality with wearable computing, as well as investigating the use of mixed reality outdoors. From the merging of mixed reality and mobility arises a hybrid reality. Another important characteristic of a hybrid reality is communication. Therefore, the transference of multiuser environments from virtual spaces to physical spaces, together with mixed reality and mobility creates the concept of hybrid reality. The illustration bellow summarizes the concept:

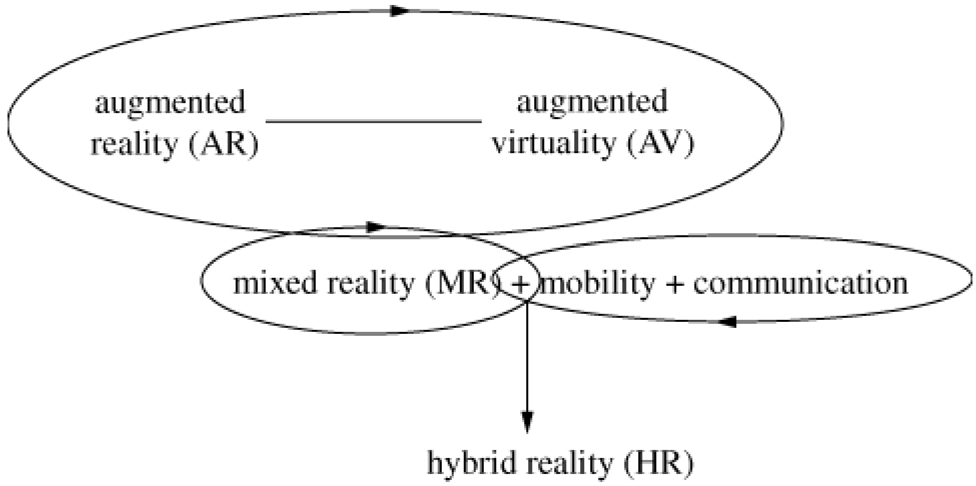


Figure 23: Definition of hybrid reality.

A hybrid space, thus, is not restricted to the use of graphics to augment digital space. Nor it is only related to the layering of digital data on physical reality. It is a conceptual space created by the merging of borders between the physical and the virtual, due to the use of nomadic technologies. Nevertheless, a hybrid space is not constructed by technology. It is built by the connection of mobility and communication, and materialized by networks developed simultaneously in physical and virtual spaces, allowing the connection among people via mobile technology.

5.2. Have we always been nomads? Considerations about the tourist, the traveler, and the nomad

5.2.1. The traveler and the routes

The idea of hybrid reality is strictly connected to the emergence of a nomadic space. Physical space has been mapped by the action of travelers, [9] who used to go to unknown and distant places, and return bringing fantastic tales that nourished people's imagination. In addition, travelers mapped the space through which they wandered. Unlike the tourist, the traveler is the one who goes without a fixed direction, travels with

[9] See chapter 3, **Multiuser environments as (virtual) spaces** for more explanation on the relation between travel and imaginary spaces.

no map, and wanders through unknown territories. Bernardo Bertolucci (1990) in the movie **The Sheltering Sky** differentiates the tourist and the traveler. The tourist is someone who thinks about going home at the moment they arrive, whereas a traveler might not come back at all. Finnish researchers Turo-Kimmo Lehtonen and Pasi Mäenpää (1997, p. 148) write that the word *"tourism* refers to the verb *to tour*, which etymologically means traveling around or making a circuitous journey." Therefore, it is implied that the tourist always comes back. Moreover, maps are connected to the traveler and the tourist in inverse ways. While the tourist carries a map in order not to get lost, the traveler constructs the map according to her route.

The act of traveling has always been critical to human cultural development, changing our perception of physical space, as well as the concept of reality. Wandering through unknown territories and mapping space, the traveler contributed to define what belonged to reality (and inhabited physical space), and what belonged to the imagination (and inhabited mental space). In the Middle Ages, for example, due to the restricted world known by Europeans, monsters and marvelous figures inhabited medieval imagination. It was, however, almost impossible to distinguish whether those figures indeed existed or were merely a product of traveler tales (Newton, 1926, p. 161). When most of the physical space on Earth had been mapped, mainly after the Great Navigations in the 15th century, many of these mythological figures disappeared, being replaced by another relation between what could be real, and what could be imaginary.[10]

5.2.2. Nomadic spaces created by nomadic technologies

Similar to the traveler, the nomad is the one who is always moving, going from place to place. However, the nomad has no fixed home location, and inhabits the whole space. Traditionally, the traveler has been viewed as a positive value, belonging originally to a place, and going and coming back to the home city. Conversely, nomadic societies are characterized by constant mobility. Historically, sedentariness has been regarded as a cultural evolution, a principle of well-organized societies, and a necessary

[10] In order to read a history about wonders and imaginary places since the Middle Ages until modern times, see Daston and Park's book **Wonders and the order of nature** (1998). Among other themes, they tell how the projection of wonders migrated from distant places into the borders of the known space.

requirement for security and order. On the other hand, *nomadism* has been a concept suggesting predefined judgments: peregrines, gypsies, homeless people, and refugees. Nowadays the word *nomad* acquires another meaning, since mobility, encouraged by technology, changes the relationship between the local and the global, between places and spaces.

Deleuze and Guattari (1987, p. 380) define the nomad associated with the war machine and the smooth space. The nomad produces the war machine and occupies and holds the smooth space. According to the authors, one aspect of the war machine is being spatiogeographic, which is related to the way nomads move through space and how space itself is defined by nomadic movement.[11] They point out three characteristics of the spatiogeographic nomadic movement. The first one is related to points and paths of the nomadic network:

> The nomad has a territory; he follows customary paths; he goes from one point to another; he is not ignorant of points. (…) But the question is what in nomad life is a principle and what is only a consequence. To begin with, although the points determine the paths, they are strictly subordinated to the paths they determine, the reverse of what happens with the sedentary. *(Id.)*

Therefore, there is a clear difference between the nomadic network and the map of the traveler. The map constructed by the traveler is composed of points (as cities), and the traveler's goal is to go from city to city, or from point to point—even if the next city is yet unknown. On the other hand, the nomad focuses on paths, on the movement that happens in between the points, but the points themselves are not that important. "The life of the nomad is the intermezzo. Even the elements of his dwelling are conceived in terms of the trajectory that is forever mobilizing them" *(Id.)*. In this sense, the nomadic space inverts the current logic of the network, in which the paths disappear as a function of the nodes (Rosenstiehl, 1998, p. 229). Nomads also go from point to point, but as a mere consequence of the trajectory.

The second characteristic of the nomadic movement opposes the nomadic trajectory and the traveler routes. Sedentary (traveler's) roads function as closed spaces to people, regulating communication between shares, whereas the nomadic trajectory does the opposite: it distributes people in an open space. Finally, the third point opposes striated space, the space of the traveler that is surrounded by walls, enclosures, and roads

[11] The other two are an arithmetic or algebraic aspect, and an affective aspect (AXIOM II, p. 380).

between enclosures, and the smooth space of the nomad. The nomad, according to Deleuze and Guattari *(op. cit.,* p. 381), holds the whole space and it is therefore false to define the nomad by movement.

This might seem a contradictory characteristic. However, the movement of the nomad should be defined in opposition to the movement of the traveler. The traveler goes from point to point. The acceleration of the traveler movement happens with the emergence of advanced transportation technologies, through which the space in between is completely eliminated, leaving only points left. The Internet accomplished a similar goal, since it theoretically eliminated geographical distances. Moreover, although each Web site represents a node in the network, the Internet surfer has no clue about how she got there. Information travels by servers and routers, choosing the best path to follow, generally unknown to the common navigator. Augmenting this idea, it is possible to think about concentrating the entire information network in an inflated point *(riche lieu),* as defined by Serres (1997, p. 142). Similarly, Paul Virilio (*Apud* Parente, 1999, p. 35) affirms that inertia will succeed continuous displacement at the moment in which all displacements concentrate in one fixed point. Therefore, there will be an immobility, which does not correspond to the non-movement, but to the potential ubiquity. For Virilio, the absolute mobility abolishes space by making it transparent.

Nevertheless, ubiquity does not necessarily replace mobility, but complements it. According to Leornard Kleinrock[12] (1997),

> nomadicity is truly a revolutionary change in information technology. Nomadicity is defined as the systems support needed to provide a rich set of computing and communication capabilities and services to nomads as they move from place to place in a transparent, integrated and convenient form. This new paradigm is already manifesting itself as users travel to many different locations with laptops, PDAs, cellular telephones, and pagers.

Kleinrock's idea addresses exactly that the space in between is no longer ignored, but occupied. No matter where the nomad is, she can have access to information. It is not the absence of movement, but a different way of understanding space and mobility: ubiquity. Deleuze and Guattari *(op. cit.,* p. 381) say that the nomad does not move because she never departs, since she has a distributed presence. Nevertheless, this does

[12] Kleinrock, Leonard. **Nomadic'97 conference:** What is nomadicity? Copyright © 1997 Technology Transfer Institute and Nomadix, LLC. All Rights Reserved. Available at: http://www.tticom.com/nomadic/abOct.htm. Accessed on: 07 Sep. 2003.

not mean that she stands still. The hybrid nomad indeed moves through physical space, however occupying the hybrid space. The nomad does not deterritorialize and reterritorialize again, like the traveler. He is the deterritorialized par excellence. "It is the earth that deterritorializes itself, in a way that provides the nomad with a territory" (*Id.*).

There are also other characteristics of the nomadic space that help to define hybrid space. First, the nomadic/smooth space is a tactile, or "haptic" space. (*Ibid.,* p. 492) It is much more sonorous than visual. Of course it can also be visual, but that is not a predominant or unique characteristic, as is the case with the striated space (*Ibid.,* p. 493). Hybrid spaces are created by the use of nomadic technologies, like cell phones, that combine equally voice, images, and text. Second, the nomad space is localized and not delimited. The nomad, in this sense, represents a local absolute, which is manifested locally, but is potentially everywhere. The nomad makes the absolute appear in a particular place. Hybrid spaces are also defined by the idea of virtuality that is always ready to emerge and to pop up in specific places. "The coupling of the place and the absolute is achieved not in a centered, oriented globalization or universalization but in an infinite succession of local operations" (*Ibid.,* p. 383).

Hybrid spaces are inserted in urban geographies. Surely the city is also a striated space, but also according to Deleuze and Guattari *(Ibid.,* p. 500*),* "even the most striated city gives rise to smooth spaces." Because she occupies the whole space, the nomad also does not have the notion of "home" located in a fixed point. "Home" is the space itself. Transporting this spatial relation to the Internet, the notion of "home" (home pages) as the departing and arriving points for the Internet navigator has had a decisive role in the structure of the network. Cyberspace, as an information network, has some features of the war machine, like connectivity and decentralization, but also some characteristics from the state apparatus,[13] such as the connection via static interfaces, hierarchy, and central perspective. As we have seen in the first part of this dissertation, what cyberspace has become did not quite correspond to the wish of connecting it to a rhizomatic and smooth space. Very early it was clear that cyberspace was not a decentralized space, and that centers, represented by search engines that guided the navigator along her journey

[13] Deleuze and Guattari (2002, p. 351-423) define the war machine as opposed to the state apparatus (smooth vs. striated spaces).

through the information space, were indeed important on the Internet. Finally, although the smooth space is defined by a shortsighted view, the attempt to create 3D interfaces striated the networked space, homogenizing it. The striated space requires a long-distance view, as the view of the map, when one can have the perception of the whole environment. The long-distance view separates the background from the foreground, creating a perspective space, acquiring depth and transforming the background in a merely visual landscape that does not belong to the nearby space. Therefore, nomadic features do not quite fit cyberspace.

Nomadic technology devices have contributed to change the concept of digital space and the way we connect to the Internet. At first, they reduce the importance (or change the concept) of having a "home," or a center. Second, the connection via large-sized monitors and cables connected to a desktop computer is replaced by transparent, portable, and wireless interfaces, which literally allow us to "carry digital space." As a consequence, mobility, which has been extremely important to the knowledge of physical space, becomes also part of the process of connecting to digital space and exploring hybrid spaces.

In the past, traveling over physical distances has been necessary to build knowledge about distant places, as well as to map space. Today it is possible to connect to all places at the same time, from a unique point *that is always on movement*. According to Leonard Kleinrock[14] (2000), "the access to wireless communications provides two capabilities to the nomad. First, it allows the nomad to communicate from various (fixed) locations without being connected directly into the wireline network. Second, it allows the nomad to communicate while traveling." The first case exemplifies ubiquitous computing, that is, the capacity of being connected to the Internet from everywhere. The second case is accomplished by the use of nomadic technology devices. Mobile communication technologies and ubiquitous computing change the concept of the digital space, as well as the organization of the physical space. Therefore, nomadic technology devices contribute to create a new hybrid space, which merges physical and digital. As a consequence, the main question from the last decade regarding the digital, "how does one

[14] Kleinrock, Leonard. On some principles of nomadic computing and multi-access communications. **IEEE Communications Magazine**, p. 46-50, Jul. 2000. Available at: http://www.comsoc.org/~ci/public/2000/jul/index.html. Accessed on: 08 Sep. 2003.

construct virtual spaces?" can now be rephrased to "how does physical space reorganize in function of the connection allowed by digital mediums?"

The awareness that the concept of digital space is no longer the same, since it is now merged with physical space, leads us to two major questions.

(1) Assuming that the concept of cyberspace as a mental and imaginary space is outdated, *where is the imagination projected* in an environment where the physical and the digital coexist? How is this imagination created by the redefinition of the concept of real and by the reorganization of physical spaces? If the traveler formerly created imaginary spaces, what kind of imaginary spaces does the nomad create? Moreover, if the traveler formerly mapped the physical space, is it possible to map the hybrid space preserving its characteristics?

(2) *How do nomadic technology devices influence the localization and structure of urban spaces?* The production of media arts and pervasive games will be analyzed as reflections of this tendency, influencing the way people communicate and interact in public spaces. This second question reconceptualizes digital as a determining factor of physical space, and no longer a mental space.

5.3. From spaces to places—displacing people and communication spaces

The act of traveling has always enhanced communication among people and helped to map physical space. Since the 19th century, however, with the development of the train, the automobile, and then the airplane, traveling has become increasingly faster. Mobile communication technologies started to develop in order to supply communication needs for those on the move. The Internet, as one of the contemporary main communication technologies, has now also been connected to the mobile network.[15]

Spaces and places have been defined in many different ways. Castells (2000, p. 453), for example, defines the difference between places and spaces by means of borders: Whereas places have defined geographic borders, spaces have no delimited borders. In addition, while spaces are connected to circulation (of goods, information, money, cars),

[15] I shall not support a technological determinism, affirming that social changes are only caused by technical development. Rather, society changes and then technology adapts itself to new necessities. On the other hand, it is also evident that new technologies influence social changes.

places are related to people and the interaction among them, that is, communication. In this context, addressing the movement of communication places from the physical to the virtual, and then to the hybrid, helps us to understand the transformations in communication and sociability patterns in contemporary society, besides comprehending how multiuser environments can now take place in hybrid spaces.

5.3.1. Disconnecting places and spaces

I might suggest that before the advent of advanced transportation and communication technologies there was no distinction between places and spaces. Although we can identify imaginary, distant and unknown places, which did not belong to the contiguous geographical location, all these places have been placed outside the physical known space. These places contributed to the creation of imaginary spaces, but did not influence social and communication practices on a local basis. Communication occurred mainly in cities, but even the "in between" space of traveling permitted encounters among travelers, and the consequent development of social relations. The pace of traveling was relatively slow, facilitating the construction of some kind of social relationship among people who traveled together.

5.3.1.1. The railroad speeding up displacement

Spaces and places started to disconnect after the emergence of advanced transportation technologies. Like the traveler, the train and the telegraph contributed to change our perception of time and space, consequently creating a new way of dealing with reality. Both appeared as technologies that speeded up time, shrinking space.

With the railway advent, speed became an important factor in everyday life. The traveling time between two points decreased substantially, promoting the "annihilation of space by time" (Marx *Apud* Schilvelbusch, 1986, p. 35). According to Wolfgang Schilvelbusch (*Ibid.,* p. 35), "the diminution of transport distances seemed to create a new, reduced geography, yet it did not actually alter the size of spaces between the points connected by the new mode of transport." Interestingly, the railroad also expanded space.

The diminution of space (i.e., the shrinking of transport time) caused an expansion of the transportation space by incorporating new areas into the transportation network.

The railway came to replace traveling by coach and, by doing so, it caused dramatic changes in the traveler's space-time perception. The duration of traveling is not an objective mathematical unit, but a subjective perception of space-time dependent on the transportation technology. Henceforth, the time spent to go from one point to another became irrelevant, since it was much faster than before. On one hand, the railroad opened up new spaces that were not easily accessible before, and it did so by destroying space, namely the space between points. According to Schilvelbusch (*Ibid.,* p. 38), "that in between, or travel space, which it was possible to 'savor' while using the slow, (…) form of transport, disappeared on the railroads. The railroad knows only points of departure and destination"—that is, the nodes of the network.

The annihilation of the "in between" space also destroyed the traditional traveler. People who used to travel in trains could no longer be considered *travelers*, since what traditionally defined a traveler was the possibility of interacting with the environment and with other people on the move. Train passengers were only aware of their destination, arriving as they left, untouched by the space traversed. When people traveled by coach, or on the back of horses, before the advent of the railway, they spent a considerable amount of time on the roads. Consequently, interaction with the environment was necessary. Also, conversation and interaction among people were likely to happen—not only among people traveling together, but also with people that one would eventually meet during the journey.

The development of the railway changed the relationship between the traveler (stuck in the interior space of the trains) and the landscape (the outside space). The railway put an end to the intensity of travel and to the connection to the environment, since the speed with which the train proceeded through the terrain destroyed the close relationship between the traveler and the traveled space. The separation from the traveled space due to the train closed compartment, and mainly due to the great speed of traveling, erased the foreground, in which the traveler used to include himself, thus creating a panoramic landscape. The speed of traveling forced the traveler to ignore portions of landscape that were close, and to direct the gaze at more distant objects that seemed to pass by slower. Straus (*Apud* Schilvelbusch, *op. cit.,* p. 53) describes the railroad journey as a complete disconnection from space and time:

> Before the advent of the railroad, geographical connections evolved, for the traveler, from the change in landscape. True, today the traveler also goes from place to place. But now we can get on a French train in the morning, and then, after twelve hours on the train (which is really being nowhere), we can get out in Rome.

The train traveler experienced isolation not only from the environment around, but also from other travelers. Originally the train compartment was designed similar to a coach chamber: a U-shaped space where travelers faced each other. This arrangement, made to encourage conversation while traveling, had an opposite outcome on trains. Coach travelers were meant to stay with each other for a long period of time, maybe days or even weeks, and needed to interact among themselves. Conversely, train travelers experienced the fast travel and the loss of contact with the outside space. Therefore, there was no longer a reason for communication. The seating in the railroad compartment forced travelers into a relationship based no longer on living needs but on an embarrassment. This situation, according to Schilvelbusch (*Ibid*., p. 75), promoted the habit of reading in the compartments. Instead of gazing at the other person in front of them, passengers felt more comfortable looking at a book or a magazine. By doing so, they also avoided the “unpleasant” experience of traveling in trains.

The invention of the railroad accelerated people’s displacement around the planet, changing current notions of space and time. Consequently, communications possibilities increased, at the same time that an increasing number of people had the opportunity to travel and to see formerly inaccessible places due to the great geographical distances. However, the railroad was also responsible for the disconnection of transportation and communication. While traveling, one was isolated both from the outside world and from other people around.

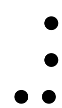
With the later invention of the automobile, the faster displacement and the circulation space created by the railroad migrated into urban spaces, annihilating the function of traditional public space and isolating people in the interior of their cars. **110110101—Organic Intelligence** is a piece developed by Kim Hager, Namrata Mohanty, Meghan Newell, Dolores Rivera, Adriana de Souza e Silva, Ashok Sukumaran, and Fabian Winkler in spring 2002, that criticizes cities as merely circulation spaces.

5.3.1.2. **110110101—Organic Intelligence**, (non) communication in the city space

110110101[16] is a collaborative project constituted of 4 cars equipped with infrared lights and walkie-talkies that run on Los Angeles' freeways: the Hollywood Freeway (101), the Santa Monica Freeway (10), and the Pacific Coast Highway (PCH, or 1). We composed a group that acted like a "conscious OI" (organic intelligence), making an intervention in the freeway space. Our goals were first to criticize cars as cellular automata[17]—programmed isolated entities—and second to focus on invisible networks hidden in the city space. The first goal dealt with freeways as (non) places in which people do not communicate consciously, since they are isolated in the interior of their cars. Inside this logic, the traffic pattern can be considered analogous to an automata behavior, somehow following a predetermined set of rules. Our group, in contrast to cellular automata, subverted the logic of traffic by creating intentional and expected patterns. We also networked with each other via walkie-talkies. Nevertheless, our conscious network was invisible to other passersby, since we used infrared lights which were not visible to the human eye. The infrared light network was used as a marking and communication protocol among the group. This "hidden" action was intended to expose the many connotations of different possible networks in the city space.

[16] The project Web site and documentation video can be accessed on http://users.design.ucla.edu/~silvaad/portfolio/video/110110110/Index.html.
[17] For a more detailed explanation about cellular automata, see chapter 1.

Figure 24: Screen shot of the documentation video: 5th Street in Downtown Los Angeles. The left-hand side shows the night shot with the infrared lights, only visible by the camera with infrared filters. The right-hand side shows the normal footage with four cars, as would be seen by any person. The pattern produced in this scene can be viewed like:[18]



The project was an experiment in networks intended to explore communication in city spaces. The action involved using a language system unique to the group, infrared (IR) lights and four-way radio communication, establishing a form of urban communication inside the freeways, an existing transportation structure on which a physical network of mobile nodes was formed. We created a hidden group identity, a mobile organism with irregular protocols, only visible to IR viewers. We became an invisible community and an invisible network within the city of Los Angeles.

[18] Later on the normal footage was disregarded. The final video only shows the infrared scenes.

The documentation movie was shot on bridges over the freeways to look at the traffic patterns from above. Scenes that show car-to-car communication were recorded mainly on the Santa Monica Freeway. The following bridges were used as filming spots:

- Vermont bridge over the 101.
- 5th-6th Street bridge in downtown, close to the 110.
- Lincoln Avenue bridge, over the 10.
- Pedestrian bridge over the 1.

Each car was equipped with an infrared light and a walkie-talkie. We used standard quartz halogen spotlights covered with infrared gels in order to create an invisible network. By doing so, visible light was almost blocked out, yet the infrared light could still be transmitted. Meanwhile, walkie-talkies allowed real-time communication among the four cars, creating a multicast (many-to-many) communication network. Our goal was to form patterns, coordinated by walkie-talkie communication, similar to the ones produced by cellular automata in a two-dimensional simulation. Our idea, however, was exactly criticizing automata and non-communicating behavior in the circulation space of the city. Our patterns, visible through the infrared gels, were formed due to group communication, in opposition to aleatory automata patterns.

During the footage, we used two cameras attached to each other, one covered with an infrared gel. In the infrared footage, lens flares were created each time one aimed the spotlight at the camera. Placing the sequences shot with the infrared filter side-by-side to the material shot with the regular DV camera, the hidden communication network (created by the infrared lights) becomes obvious.

Los Angeles is the city of cars. The freeways represent the transportation network, originally a symbol of the space of fluxes, which connects and moves the city. Freeways were designed to allow people to go from place to place much faster than using the streets. Therefore, they create another layer within the already existing transportation network, which includes streets, subways, and formerly railroads. Although representing a transportation and linking structure, freeways contribute to the non-communication among people, because each one is isolated in the interior of his own car. This fact becomes more evident when we look backward to the function of old traveler routes, which were basically places in which people met each other while going from place to place. With the development of the urban transportation network, cars have become autonomous units, functioning as workspaces and also as nodes from other kinds of communications networks, allowed by means of nomadic technology devices. The **110110101** project focused on the connection between the city and cars as transportation technologies, looking at freeways as new transportation and communication networks. The project also called attention to the fact that freeways are non-places, that is, non-communication spaces.

Although automobiles have become the basic transportation means in almost all metropolises in the world, the development of the car system in L.A. has its own peculiarities, which clarifies why cars turned out to be so popular in the city. The automobile had been introduced into city life during the beginning of the 20th century and car ownership rapidly increased. Four main reasons contributed to the fast development of cars as transportation technologies: the mild, dry climate (ideally suited to driving), the low-density patterns promoted by the street railways, lots of space for storage and maintenance of cars (which were unavailable in dense urban residential quarters in the east), and the dispersion of destinations.

This last reason was a consequence of the development of another layer of the transportation network: the railroad. There is a remarkable difference between the growth of railways in the east and in the west of the United States. While in the east already densely populated cities offered restricted places for the construction of railways at the end of the nineteenth century, the west was pretty much uninhabited. According to Martin Wachs (*apud* Scott; Soja, 1998. p. 108), cities like Boston, New York, and Philadelphia "had developed to a considerable size before the advent of street cars, and because walking was the primary mode of transportation, they were characterized by areas of extremely high population density." On the other hand, the city of Los Angeles was still small by the time of the railroad advent. Actually, the emergence of the railway network played an important role in the development of the city space. Shrinking distances and making traveling faster, the train helped the expansion of the city and the emergence of low-density population areas, which turned out to be one of the main characteristics of Los Angeles.

Right after the First World War the citizens of L.A. had one automobile per nine people, by far the highest rate of automobile ownership in any major American city (*Ibid.,* p. 112).This rate kept on growing, resulting in increasing congestion on the streets, especially in the inner city, growing much more quickly than street widening. Also, the increasing number of cars had a devastating effect on the street railways, causing accidents and preventing trains from running freely. These problems led to the creation of several transportation plans; one of them formed the basis for the first and largest metropolitan freeway system built in the United States.

The Los Angeles's freeways constitute an important network that cuts off the city space and connects distant places. Consequently, they play an important role in the city communication and flow. Networks (transportation, communication, digital, or physical) have common characteristics such as spatial quality and connectivity. Networks are non-centered systems made of nodes and paths. Hence, it is possible to enter or to exit a network from anywhere. In addition, its paths are not supposed to be completely covered. This is true both for digital networks like the Internet, and for physical networks, like freeways. As almost all networks, freeways have several exits and entrances, and it is possible to access them from many different places. Conversely, the railway network that existed before the freeways was a centered system: train stations represented the departing and arriving places where people should go in order to access the network. Airports today play the same role in the air network.

Although networks happen in space (they are spatial structures), their meaning depends on the places (nodes) that they connect. The telegraph, for example, is a network that promotes long-distance communication, therefore eliminating (or shrinking) the space between both nodes. Due to the speed of traveling, freeways also connect distant places very quickly, becoming thus part of the *space of flows,* as defined by Manuel Castells (2000, p. 442). Yet freeways are non-places, since there are no social interactions within it. Similar to the railroad, freeways both shrink and expand space. The expansion of space, incorporating new areas into the transportation network, was critical to the development of the city of L.A.

Using the "in-between" space of the freeways, **110110101** intended to bring the traveling space back, that is, we looked forward to using the freeway not only as a means of arriving somewhere, but also as a traveling space, in which people would be able to talk and to communicate, as well as to interact with the environment. Our goal was also to increase the importance of paths, pointing toward a nomadic space that is created by the use of nomadic technology devices. The intention was to show that it is possible to use transportation and communication networks not only to connect to people physically absent, but also to promote the communication with others in the vicinity.

Cars do not promote panoramic travel like the train, since train travelers are only able to watch the landscape through the side windows. Among the many differences between traveling by car and by train, one is that the car driver is able to stop whenever she gets tired, therefore being able to experience the landscape and the traveling space. This statement is true for traveling on highways, yet it cannot be applied to freeways. There are no stopping points on freeways, unless one exits it. In addition, similar to the train traveler, car drivers are generally stuck inside their cars, barely having any contact with the exterior space. Meanwhile, the outside space is also perceived as a distant landscape, thus disconnecting the freeway from the cityscape, given that the city *is* and *is not* there. Similar to train travel, the foreground is erased, transforming the city into a background, into an unaffected space. Hence, the city and the freeway function as one and discrete units, because, although the freeway belongs to the cityscape, it is also detached from it.

The isolation experienced by the freeway driver has its origins in the seclusion lived by the train traveler. Nowadays, in cars the isolation is complete, due to the fact that drivers are generally alone. Modern traffic increasingly reduces the majority of sensory relations between human beings to mere sight. Also, car drivers search for activities to substitute reading (since it is impossible to read and to drive at the same time). Consequently, cars have been transformed into real workstations and amusement places, equipped with cellular phones, radios, CD players, and GPS devices. While traveling, it is possible to listen to music, enjoy the landscape, communicate with different people, and even have some work done. Car drivers are isolated from the outside environment, but they support different types of connections via digital technology. The transformation of cars into workstations has become true mainly due to the heavy traffic on the freeways, which in fact annihilates the symbol of circulation and speed. Being stuck in traffic, unable to drive and also to circulate, people must find something else to do, and they look for a way of not “losing” time.

The idea of circulation, however, is not new. It is contemporaneous to the railroad. Circulation was a positive value in the 19th century and from its inception it had a dual significance: It referred to the actual movement of people and goods, as well as to the circulation of the blood. The reality of circulation was contained in the biologization of social processes and institutions that is so typical of nineteenth-century thinking. Freeways in the 1950s were also the main symbol of the city circulation. But the situation is now different. What happens to the city of circulation when the circulation no longer occurs? Convertible cars from the 1950s, symbols of freedom and speed, which alluded to the view of the wind blowing in the driver’s hair have been replaced by standard cars with closed windows and air conditioning, equipped with stereo systems, and no movement at all—especially during rush hour. What is the next step in the traffic pattern, when the city of circulation no longer moves? In addition, opposite to traveling by trains, when the landscape changes because one travels through a great amount of land, the landscape viewed from the freeways is always the same. On freeways, like the nomads, one never leaves, just arrives. The city is always there. Whenever you take an exit (if it is possible to exit at all) there are always the same stores, the same advertisements, even the same streets.

The idea of circulation addressed the city as a body and cars as the elements that circulated inside the body flows, like cells in blood. In our project, the traffic represents the flow and the cars, independent units within this flow: circulating isolated cells. Observing the flow of traffic from a distant perspective, each car seems to behave as an independent unit (or cell) within the freeway. Looking at the freeway traffic from an outside perspective turns it into a *space of flows,* because we are unaware of origins and destinations. We are only able to watch traffic patterns, and its units circulating through the transportation network, which appears as a cellular automaton behavior. Criticizing cars as programmed isolated entities, we assumed that drivers do not interact with the environment and only behave according to the position of their nearest neighbor (in this case, a car).

If drivers do not use the freeway as a communication place, due to the speed of the circulation and to the annihilation of the "in-between" traveling space, they are also not conscious of being located in that space. They are everywhere but in the freeway. This fact generates an autonomous behavior, since drivers do not need to think that they are actually there. Driving has become a "programmed" behavior like cellular automata.

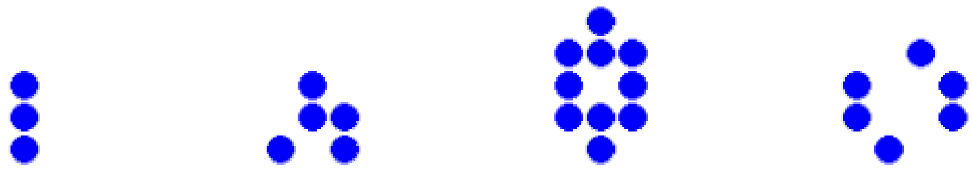


Figura 25: Examples of cellular automata patterns, similar to the ones we performed on the freeways.

Without being conscious of their role inside the circulation space, drivers (represented by their cars) follow an automaton behavior while in traffic. In fact, driving becomes almost a pre-programmed action. Once one knows how to drive, one does not need to think about it. The driver just needs to pay attention to the (non) flow of traffic, behaving according to other surrounding cars. However, the apparent interaction among cars is not really a communication protocol. Drivers are only following a set of traffic rules so that the traffic pattern can evolve. Examples of driving rules are:

- "Maintain a fixed distance from the car in front of you."
- "Look back before changing lanes so you don't hit the car beside you."
- "Look at the back mirror before braking to make sure the car behind you has enough time to stop."
- "Drive within the flow, keeping the same speed as other cars near you, so you don't separate from the pattern."

By doing so, cars belong to a traffic pattern that, just like cellular automata, has no central control. Nevertheless, they act together in order to keep the system working.

What happens, then, if there are aware cells within the grid that do not follow a programmed set of rules, because they are conscious of their role in the space of circulation? Our goal in the **110110101** project was to address cars (and car drivers) as OIs (organic intelligences)—in contrast to artificial intelligences—and subvert the logic of traffic. As organic intelligences, we in fact formed patterns, yet our patterns were conscious and not programmed (in contrast to cellular automata patterns, which are programmed and unpredictable). Also, we were not isolated units, since we had communication protocols (such as walkie-talkies and infrared lights) that promoted the group cohesion.

Acting as a conscious group, we were changing the traditional meaning of the freeway space twofold: First, we were not using the freeway only as a connection mechanism, a non-place that had no meaning in itself. By forming patterns and communicating with each other we were actually transforming the freeway into an active place, therefore, connecting it to a hybrid space, in which people communicate with each other and interact with the environment. We were bringing back the space "in-between."[19] Second, by interacting with each other we were trying to bring the awareness of other kinds of communication protocols that happen in the space of the freeway, about which we are not conscious. For example, an automobile can be linked in several directions: to other cars stuck in traffic miles away, environmental monitors, and satellite navigation antennas. Also people inside an automobile can be talking on the phone with somebody who is not physically present, sending e-mails, and listening to radio. Conversely, in its place a car can only interact with other cars within braking distance of its front and rear bumpers. Invisible networks are also mobile networks.

Finally, the reference of conscious OI was created in opposition to artificial intelligence. Research on artificial intelligence focuses on the construction of machines and software capable of exhibiting models of thought that are generally considered the product of an intelligent mind. Many investigations in this area propose that thought, cognition, or at least some cognitive processes are not restricted to the human mind: They might be perceived in programmed artificial entities (Bruno, 2002).

In trying to reproduce human intelligence in artificial machines and software, researchers attempt to prove that identical cognitive functions can occur using different

[19] A quick note regarding the term "intervention in the freeway space." Obviously, we were only concerned to establish communication protocols and to modify traffic patterns as metaphors for utilizing the in between space, which had been forgotten for so long. In practice, however, the outcome has been different. Trying to drive in a road differently from other vehicles aiming at aligning four cars running in high speed turned out to be extremely dangerous. The conclusion is that, for the flow of traffic, collaboration and collective action are indeed necessary.

material supports, either neurons or silicon. Therefore, a mind should be defined by what it is able to do, not by the material that constitutes it. Thus artificial intelligence, oriented by the computational hypothesis, concentrates on the construction of machines capable of simulating symbolic processes, which involve decision making and problem solving in human beings. Consequently, borders between human and non-human, natural and artificial are blurred.

In our project, cars as programmed artificial entities did not show any intelligent behavior. They were mere automata. Conversely, our group represented a conscious organic (non-artificial) intelligence. Our goal was focusing on our community as an organic intelligence (OI), a concept that was connected to the development of consciousness about the hybrid space in which we were. Organic here is coined in opposition to artificial, given that artificial entities in principle do not require consciousness. Although AI beings are able to interact with the environment and with each other, they are still considered automata. Our consciousness is developed by the awareness of intervention on the freeway space by using different communication protocols in order to form a community.

5.3.1.3. From places to spaces: toward digital spaces

The emergence of freeways as non-communication places is a symptom of the growth of cities as circulation spaces. The increasing circulation speed and the impossibility to communicate while moving transformed city spaces into processes, instead of places (Castells, 2002, p. 417). Of course local interactions have always happened, and always will. However, simultaneous with the fear of people's isolation in the interior of their homes, offices, and cars, the Internet acquired importance as a new and alternative communication "place." Therefore, interaction places arose among the flows of information.

The Internet is also a communication medium, and has been frequently viewed as the convergence of the acceleration and virtualization of displacement over the space. Moving on the Internet does not mean moving physically, yet it considerably amplifies the possibility of knowing new places and people. As a result, the Internet has been regarded as an environment in which one could move around without changing places.

As we have seen, sedentariness has been historically considered a positive value and the possibility of traveling and communicating without leaving one's desk has therefore been viewed optimistically. During the past two decades, since the invention of e-mail, the information network has been synonymous to an immaterial space, and the notion of space is completely replaced by time. In the 19th century, Morse was toasted for the "annihilating space" caused by the electrical telegraph[20]; in the 20th century however, the Internet accomplished this goal much more efficiently. By annihilating the physical space, the Internet also created instantaneous time. Needless to say that all these statements demonstrate a utopian thought created around cyberspace, or the Internet, during the last twenty years. Meanwhile, low bandwidth connections have made us always aware of time and delay. Moreover, "knowing" a place through the Internet has never replaced physically going there. It is undeniable, however, that the Internet, following the history of communication media, facilitated interaction, allowing a huge amount of people to be in contact with each other. The Internet also went beyond the telephone, allowing community formation by means of multi-cast communication. These multiuser environments, constructed metaphorically like physical public social places, have attracted many people who have been displaced by the city of circulation, and who were looking to know other people outside of their geographical borders. During the last decade there has been a common belief that these "virtual" communities would indefinitely grow, and that communication would increasingly migrate to cyberspace.

Kevin Kelly[21] (1997) differentiates places and spaces, stating that spaces are not bound by proximity, while places are geographically contiguous. "As rich as physical places are (…), they limit the number of connections that entities can make within them. A person in a place can only interact with a fixed and rather small number of other people in the same vicinity."

According to Kelly, *(Id.)* a space, unlike a place, is an electronically created environment. Therefore, the transference of games to the Internet has been viewed as a great advantage, since a person in an electronic space could communicate with a huge

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[20] Please see paragraph about Morse and the telegraph in chapter 4, **Art, graphic interfaces and virtual spaces: case studies.**

[21] Kelly, Kevin. **New rules for the new economy.** 10 radical strategies for a connected world. New York: Penguin Books, 1999. 171 p. Available at: http://www.kk.org/newrules/. Accessed on: 06 Sep. 2003.

number of people at once, much more than it would be possible in physical space. However, the author tells that some companies that produce multiplayer online games found out that even a minimal delay on multiuser communication causes real-time experiences to fail. “That noticeable gap makes no real difference in the transmission of a book order, or a weather signal, but enough of life thrives on subtle instantaneous responses that one-eighth of a second kills intimacy and spontaneity” *(Id.)*. Therefore, Kelly states that a natural consequence of this technical delay is the endurance of face-to-face communication, since there is no replacement for it online. He foresees that transportation technologies, like the airplane, are going to develop as much as communication technologies. However, what happens when we can combine movement through space, long-distance communication, and face-to-face interaction?

5.3.2. Reconnecting places and spaces: toward hybrid space

Kelly *(Id.)* states that the true meaning of a space is not related to its “non-geographical virtuality,” but to its ability to absorb connections and relationships. Therefore, the concept of space is not geographical, but networked. As we have seen, networks are spatial structures, and what guides their existence is the large number of connections embedded in them. A hybrid space is also a networked space, constituted by a mobile network of people and nomadic technologies that operate in non-contiguous physical spaces. Therefore, in order to integrate this space, a node (e.g. a person) does not need to share the same geographical space with another node of the mobile network. The hybrid space is created exactly by the enfolding of different and discontinuous places within each other.

Kelly *(Id.)* indeed affirms that “place still matters, and will for a long time to come. However, the new economy operates in a ‘space’ rather than a place, and over time more and more economic transactions will migrate to this new space.” Manuel Castells (2000, p. 442) has a similar approach when defining the *space of flows* as an economic circulation space not restricted by geographical boundaries. However, Castells’s *space of flows* transforms cities into processes, combining simultaneously physical and virtual spaces. In fact, the invisible network that connects the whole globe occurs in both spaces.

In opposition to the main modern theories, which tried to state the predominance of time over space, Castells (*Ibid.,* p. 407) proposes a model in which space commands time. I have argued that the former development of advanced transportation technologies helped to shrink space, by making traveling time shorter. Castells's model, on the other side, is based on a network of flows, and networks are spatial entities by definition. A network can only exist in space. Therefore, networks can be better analyzed as essential structures of physical spaces, rather than virtual formations.

Castells (*Ibid.,* p. 424) also foregrounds the importance of social practices in defining the city space and denies that many types of human interactions would just "migrate" to virtual spaces. As an example, teleworking in big metropolitan cities has been regarded in the past as the activity of the future. Nevertheless, already in 1988, "a leading European researcher on telecommuting could write, without the shadow of a joke, that 'there are more people doing research on telework than there are actual teleworkers" (Castells, *op. cit.,* p. 425). Also transportation problems in cities actually did not decrease, considering that people were no longer confined for eight hours inside an office and became more mobile. Time and appointments became flexible. Moreover, higher concentrations of markets in certain areas contributed to create extra traffic problems and the emergence of e-commerce absolutely did not replace big shopping malls and commercial streets. Telebanking also only supplemented physical branches, instead of replacing them. Finally, although distance learning has been greatly pushed forwarded with the Internet, it is clear that face-to-face interaction between teachers and students is still crucial. Distance-learning techniques are being developed in order to improve and multiply this contact, instead of immersing students in an impersonal and isolated environment, as would be the case with learning from home. Teleconferencing and online learning are used in order to complement and help classroom education, enlarging learning possibilities and the contact among professors and students. Castells (*Ibid.,* p. 428) concludes arguing that we can perceive in the city "simultaneous spatial dispersion and concentration via information technologies."

Indeed the city will most likely never disappear, nor has it been endangered. Although the Internet has been viewed as an ideal communication space, "virtual communities" never replaced face-to-face interactions. However, the Internet undeniably opened our consciousness to the possibility of communities which were not confined to the same physical place, known as multiuser environments. Nomadic technologies now create also non-contiguous communities in physical spaces. We cannot compare these communities to traditional face-to-face interactions, since the communication happens both among people who are close in physical space, as well as among people who do not share the same geographical location. The emergence of communities in hybrid spaces is a factor allowed by mobile communication technologies. In order to create sociability, one needs to share neither the same vicinity, nor to be at a specific place connected to the Internet.

Physical spaces have always been social spaces. Nomadic communication technologies recreate urban spaces as multiuser environments. Therefore, urban spaces, which had already changed from places to processes, transform now into hybrid spaces. We have seen that communication has mostly happened in physical spaces when the speed of traveling and/or circulation was relatively slower, enabling people to meet each other while on the move. With the rise of the Internet, communication moved partially to virtual spaces, in which one could experience "instantaneous time" while staring in front of the computer. After the emergence of nomadic technology devices, the multiuser environment takes place in a hybrid space. That means that it is possible to communicate with people who are not physically present while moving through physical space, which is also inhabited by other people. Consequently, it is exactly the enfolding of contexts that creates the multiuser experience.

> "People are going to stop carrying around things like laptops… More and more devices are going to fit in your pocket. People will discover that their mobile can handle video, work like a Palm Pilot and be a phone. It's much more powerful than what they have at home… And what will we call these non-phones? 'We're calling them communicators.'" (Jan Uddenfeldt, chief technology officer at Ericcsson *Apud* Koskinen, 2002, p. 115)

6. INTERFACES OF HYBRID SPACES

Portable interfaces transform our experience of space, contributing to create hybrid spaces. Some examples are PDAs (Personal Digital Assistants), Palmtops and even laptops. Other types of nomadic technologies that can be carried by the user include wearable computers, which have a strict relationship to fashion and personal items. Frequently cell phones are considered wearable technologies, since they are carried very close to the body. Realizing this fact, cell phone designers started producing smaller and more "handy" devices. Another related technology is ubiquitous computing, which fills physical space with computers, thus making them available from practically everywhere.

This chapter addresses digital interfaces that make us "inhabit" hybrid spaces. In chapter 1, I analyzed interfaces of immateriality as physical interfaces that connect us to "cyberspace." Mice, monitors, desktop computers, and HMDs have been considered static interfaces that promote the feeling of immersion in virtual spaces. Conversely, mobile and portable interfaces are embedded in physical space, enhancing interaction between physical and virtual spaces. Furthermore, cell phones and other nomadic devices are responsible for the feeling of being *always connected*, in contact with digital spaces.

This chapter analyzes some characteristics of mobile interfaces, such as ubiquity, wearability, and transparency. Also it focuses on cell phones that are no longer just cell phones, but include SMS (Short Message Service), images, video, Internet connection, and location-based systems. Current studies about the social implications of mobile phones, regard them as devices that transmit voice and text.[1] From this standpoint, cell phones are merely mobile telephones or mobile e-mail sender terminals, through which

[1] Cf. Brown; Green; Harper (2002), Katz (2003), Katz; Aakhus (2002), Plant (2001).

users coordinate aspects of everyday life, with greater "control" and privacy over their identities and selves.

This book, on the other hand, views mobile phones as ludic devices. As a result, it presents cell phones not only as business devices, but also as interfaces used in "non-serious" parts of life: for sociability, art, and games. Cell phones thus nourish the emergence of new places for the imagination, creating new relationships between the real and the imaginary. After the introduction of image and video, as well as GPS capabilities, mobile phones began to foment new types of sociability and develop new perceptions of physical spaces. New types of sociability include ludic practices, such as playing games and visiting artistic spaces. Pervasive games and large installations in public spaces reinterpret urban spaces, overlaying imaginary spaces on the cityscape.[2]

6.1. From immateriality to materiality

The first decade of the 21st century observes a change in what was formerly called "cyberspace." At first considered an immaterial space, built for the human mind and detached from physical reality, now it merges with the physical environment. Mainly due to the emergence of mobile technology devices, ubiquitous computing, and wearable interfaces, we live in a hybrid reality that includes both the virtual and the physical.

The emergence of the World Wide Web in the 1990s created a new type of space: a virtual digital realm that shared with the physical the status of reality. Hence, it expanded ways of inhabiting the world, because virtual spaces could also be built according to our imagination. Inhabiting imaginary spaces is not a novelty in human history. Art and literature have for a long time filled human mind with new and "unreal" places. Nevertheless, there has never been a virtual space with which people could interact and that users could share via diverse digital interfaces. In addition, it has become possible to communicate with people from different places in the same virtual environment, thus creating a new sense of community. Cyberspace, however, has traditionally been considered an immaterial space, a place for the mind, contrasting with physical reality, which is inhabited by the physical body.

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[2] See chapter 8 for examples of installations in public spaces, and chapter 9, for pervasive games.

In the last 50 years, the development of computer simulations and virtual reality fostered the creation of other types of realities that could also be imaginary, that is, that could be nonexistent in the physical world. The opportunity to inhabit and interact with these alternative realities changed the traditional distinction between the real and the imaginary. Henceforth, imaginary places were not only considered what was inside our minds, but also what made up virtual spaces that could be constructed by means of technology and shared with other people.

Recently the emergence of mobile technology devices and ubiquitous computing has contributed to the possibility of being always connected to digital spaces. It has become possible to literally "carry" the Internet wherever we go, feeling as though we are everywhere at the same time. Mobility is a critical characteristic of hybrid spaces. New mobile technologies contribute to the appearance of a new concept of reality, which conceptually merges the physical and the digital spaces, since the digital is no longer considered an "alternative space." Hybrid spaces are part of our everyday life and hence necessary to human communication and interaction. The hybrid notion of space simultaneously enlarges the world (creating a new type of reality constructed *at the same time as* the physical and the digital), and also narrows the world (eliminating physical distances and allowing people from different places to connect to each other).

Since the end of the last decade, it has grown progressively clearer that physical and digital spaces have become firmly interconnected. Cyberspace is no longer regarded as an isolated space for the mind, but as a space mixed with the physical environment. Actually, the concept of cyberspace itself is now outdated, since it originally meant a world of information that exists apart from material space. This hybrid reality has become true partially because the way we connect to digital spaces is changing from the imaginary neural implants and computer screens to mobile technology devices. When digital space becomes contiguous to physical space, the question, "should it simulate the real?" is no longer significant, because both spaces are merged in the same environment.

6.2. Ubiquitous computing: an earlier view on bringing the digital inside the physical

Already more than 10 years ago, Mark Weiser (1996), from the Computer Science Lab at Xerox PARC (Palo Alto Research Center), predicted that we would be moving toward a third era in the history of computers. The first era he called mainframes, characterized by one computer being shared by lots of people. At this time, computers were run mostly by experts. The second phase, in which we were in the last decade, was called the personal computing era, when person and machine stared uneasily at each other across the desktop. Each personal computer was meant to belong to one person. Next came ubiquitous computing, or the age of *calm technology*, when technology receded into the background of our lives. The relationship is then many computers to one single person. Thus, ubiquitous computing happens when computers are embedded in our daily lives and no longer part of a distant reality. In this sense, "ubiquitous computing is roughly the opposite of virtual reality. While virtual reality puts people inside a computer-generated world, ubiquitous computing forces computers to live out here in the world with people" *(Id.)*.

Weiser was a visionary, for as early as 1987 he and his group at the Electronics and Imaging Laboratory at Xerox PARC started thinking about spreading out computers ubiquitously through the environment. The idea was to embed computers into the physical world, albeit not perceivably. He believed that the future of interface design was leading us to an era of invisible interfaces. "A less-traveled path I call the 'invisible'; its highest ideal is to make a computer so imbedded, so fitting, so natural, that we use it without even thinking about it" *(Ibid.)*. But isn't that the primary goal of computer technologies? Since the invention of the personal computer, it has been constructed with layers of interfaces (monitor, hard drive, floppy drive, operational system) that tried to make using the machine transparent to the user. These interfaces were means of re-representing the digital for humans, in a language that would be understandable to us. The more imperceptible the interface, the more the user felt she could communicate with the machine.

However, the goal of personal computers' interfaces was to make the relationship between one user and one computer so natural, that the user could be immersed in the digital environment without even realizing the detachment from the physical space. The path from mainframes to PCs corresponds to the passage from the culture of calculations to the culture of simulations (Turkle, 1995, p. 41). The Graphic User Interface (GUI) simultaneously hid the code behind the screen, allowing an intuitive relationship to the personal computer, and also simulated the physical world, nearly saying, "You no longer need the physical desk because all your actions can now take place on the virtual desktop." The passage from personal computers to calm technology inverts this relationship. Arguing, "the world is not a desktop," Mark Weiser[3] (1994) tried to figure out what would be the metaphor for the computer of the future.

The main problem he identified regarding PCs was their obvious visibility. They required too much of our full attention. A good technology, according to him, functions like a tool. A tool, when properly used, disappears as a function of its use, moving to the background of our attention. Weiser supported the claim that calm technology would move back and forth between the center and the periphery of our attention. For example, "the ink that communicates the central words of a text also, through choice of font and layout, peripherally clues us into the genre of the text" *(Id.).* Conversely, bad typography or poorly constructed sentences tire the user without apparent reason. When talking about transparency and functionality, Weiser probably had in mind functionalistic rules that guided the design of objects, buildings, and pages during most of the 20th century. According to Functionalistic movements, the form of an object should follow its function, thus making the object disappear according to its use. The same, in this case, was valid for typography: good typography should "disappear" to give the meaning of the text visibility.

Nonetheless, a calm technology would move to the foreground of our attention when, for example, the user needed to control the device. This movement backward and forward, from the periphery to the center of our attention, created, according to Weiser *(Id.),* a natural relationship to technology. When things are on the periphery, we are still

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[3] Weiser, Mark. The world is not a desktop. **ACM Interactions**. Jan. 1994, p. 7-8. Available at: http://www.ubiq.com/hypertext/weiser/ACMInteractions2.html. Accessed on: 25 Aug. 2003.

aware of them, but they do not require our full attention. Also he stressed that not all technology should be calm. Telephones, for instance, are not calm technologies, because they require our full attention when ringing. However, as will be discussed later, they are indeed ubiquitous.

During the 1990s, Weiser's group at Xerox developed some prototypes they envisioned would be the ubiquitous computers of the future. These prototypes included boards, pads, and tabs. The LiveBoard allowed, among other functions, remote drawing collaboration, and was sold to schools until 1998. The ParcPad maintained constant network connectivity and was used for radio, protocol, and mobile networking. Finally, the ParcTab could be used with one hand and included a location-sensitive, agent-based infrared network. These devices foresaw much of the critical functionalities in today's cell phones, like mobile networks and location-based services.

Weiser also foresaw consequences for the use of ubiquitous computing: surveillance and control. Once one creates computers that are invisible and extensive, it becomes hard to know who is controlling what and who is observing what. N. Katherine Hayles (1996, p. 6) observes that in the beginning of the 1990s, "employees at the PARC are provided with interactive badges that communicate with sensors in the ceilings, which in turn signal confirmation about the employees' locations to a computer network." Surveillance mechanisms have grown in importance, especially inside people's imagination: What are the (malignant) consequences of bringing computers to physical space? The paranoia of surveillance is also connected to the miniaturization of interfaces. Transparency thus can be related to ubiquity, as well as to tiny interfaces that can be placed even inside the body, controlling humans without their awareness.[4]

Yet in the 1990s researchers and artists at PARC were not so much concerned with surveillance, but with bringing the digital world inside the physical environment. A critical question at that time was how to represent digital information in the background of physical space. Natalie Jeremijenko, an artist in residency at PARC, created the **Dangling String**, an 8-foot piece of plastic spaghetti that hung from a small electric motor mounted in the ceiling. The string monitored network activity, becoming

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[4] The imaginings about nanotechnology, which will be discussed in chapter 8, currently lead this type of thought.

"nervous" and emitting sounds if traffic was heavy, and "quiet" if traffic was slow. The **Dangling String** hung on an unused corner of the Research Center's hallway and did not interfere with employees' movements around the office space. On the other hand, it was an important tool to hear and visualize network activity without the need to be connected to a desktop computer.

Transforming bits into a palpable experience is also the aim of Hiroshi Ishii and The Tangible Media Group at the MIT Media Lab. Ishii (1999, p. 232) declares he has been inspired by Mark Weiser's vision related to ubiquitous computing. However, he points out that his group's goal is not only to make computers ubiquitous per se, but also to transform physical objects into interfaces to interact with digital environments. Ishii differentiates *tangible media* from the traditional Graphic User Interface, virtual reality, and augmented reality, although he admits also being influenced by augmented reality research. Nevertheless, while augmented reality generally superimposes graphical data on physical space,[5] Ishii's group creates graspable physical objects that function as interfaces. The interfaces created by his group belong to at least one of the following categories: (1) interactive surfaces between physical and virtual spaces, (2) graspable physical objects that couple bits and atoms, and (3) ambient media, represented by background interfaces such as sound, light, and airflow. These ambient media, of which Jeremijenko's **String** is an example, aim to transform the entire physical environment into an interface.

By creating sensible environments, Ishii brings computation from the digital desktop to the physical world. As we saw in the last chapter, he also points out another trend from this computational locus shift: the move into our skins/bodies. This second trend can be represented first by wearable computing, and second by nanotechnology, the science which constructs matter from the bottom up.

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[5] Similarly, the GUI and virtual reality create a pure world of graphic data, generally disconnecting the user from the physical space.

6.3. Wearable computers: carrying the digital space

While ubiquitous computing and tangible bits are related to spreading out computer technologies around the physical space, thus transforming the physical environment into an interface, wearable computing focuses on adapting this technology to the body, allowing computers to move with us. The concept of wearable computers includes fashion and clothing, besides being related to identity and personality. Wearable computers have many common points with the previously mentioned interfaces. First, they are meant to be transparent, since the user should not be "annoyed" by the presence of the computer. Second, they bring digital space into physical reality, allowing the user to be constantly connected. Third, they change our perception of physical space by merging digital data with it. Finally, wearable computers can also be regarded as tools.

N. Katherine Hayles (1999, p. 34) points out different meanings acquired by tools throughout the centuries. In the 19th century, mainly due to the Industrial Revolution, using a specific tool could shape the body, as the woodcutter becomes strong due to the use of an axe. Later in the 20th century the human being was transformed from a *tool user* to a *toolmaker*. Yet in the 21st century, the emergence of the post-human changes again the meaning of the word *tool,* from something detached from the body to a prosthesis (part of the body).

Hayles (*Ibid.,* p. 84) tells that in the 1970s Gregory Bateson asked his graduate students if a blind man's cane could be considered part of the man.

> Most of his students thought that human boundaries are naturally defined by epidermal surfaces.... However, cybernetic systems are constituted by flows of information. In this viewpoint, cane and man join in a single system, for the cane funnels to the man essential information about his environment.

Being an important mediation between the man and the world, the cane becomes a transparent tool, and therefore part of the man. The cane's value is then defined by the information extracted from the world and transmitted into the man's mind. In the 21st century, these tools are getting smaller, connecting the subject with digital data. The traditional notion of the cyborg combines the cybernetic mechanism and the organic being, creating a cyber-organism. The cyborg is composed of man and machine, natural organism and artificial mechanism. Now, the evolution of digital technology indicates that we are going far beyond the cybernetic organism, since the splice implied by the cyborg is currently configured in more flexible and sophisticated ways.[6] Consequently, the word "splice" is probably no longer the right metaphor to describe the emergence of a hybrid organism. This new "structure" is more flexible and more diverse, and is composed of many more types of interfaces, which are becoming wearable, ubiquitous, and invisible. When one can no longer distinguish between natural and artificial, it is impossible to locate the splice characteristic of the cyborg. Today the splice is no longer visible: it might be inside our bodies.

Furthermore, tools are also used to extend one's mind into the physical environment, according to Daniel Dennett's (1996, p. 134) idea mentioned in chapter 1. Dennett (*Ibid.,* p. 146) emphasizes the importance of words and writing as extensions of our memory. Thus, while the blind man's cane can be regarded as a tool that allows the flow of information from the environment into the man's mind, words do the opposite, offloading information from our minds into the physical space. Although words are culturally the most important tools, computers can also be regarded as "tools for thought." Furthermore, computers are not only extensions of thought, but also extensions of the physical world into our minds (they work as part of our bodies, as well as extensions of contiguous spaces).

The idea of the cyborg comes from the transformation of digital interfaces into prostheses attached to the human body. The new hybrid cyborg watches the prosthesis become either invisible or undefined, meaning that it does not need to be connected to the body in order to be viewed as extensions of the subject. Can cell phones and other types of nomadic technology devices be considered tools or prostheses?

Although the history of wearable computers can be traced back to the second cybernetic wave, when Claude Shannon and Ed Thorp revealed an analog wearable computer used to predict roulette wheels,[7] significant inventions in this area started to take place in the 1970s. Steve Mann[8] (1997), professor at the University of Toronto,

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[6] N. Katherine Hayles, in an interview to the author (19 Nov. 2002).
[7] To view a timeline of wearable computers, see http://www.media.mit.edu/wearables/lizzy/timeline.html and http://www.media.mit.edu/wearables/mithril/history/. Accessed on: 17 Dec. 2003.
[8] Mann, Steve. 'Smart Clothing': Wearable Multimedia Computing and 'Personal Imaging' to Restore the Technological Balance Between People and Their Environments. **MIT Media Lab,** 1996. Last

Canada, who designed a backpack-mounted computer in 1981, points out three main characteristics for wearable (or existential) computers. First, they are part of the self, and not a separate object carried by the user. Second, the apparatuses should be controlled by the wearer. Finally, they should be constant, that is, they should never be turned off. When not used, they go into sleep modes, but they are always ready to turn themselves on whenever required. The second and third characteristics are aligned with Mark Weiser's description of ubiquitous computers: devices that should always travel back and forth across human attention, automatically and/or via user control. The first characteristic, though, excludes nomadic technology devices from the category of wearable computers. I will argue that this concept is suited to change to include mobile phones.

Mann *(Id.)* points out that existential computers can be used for all facets of living, and not just for work, as desktop computers have been frequently regarded. Therefore, wearable computers belong to the ludic side of life, influencing human interaction and perception of the outside world. Certainly, when computers can be carried around, they become part of our lives, for there's no longer the need to go to a computer—they are always with us.

It's interesting to think that wearable computers have developed simultaneously to the GUI in desktop computers. Although in the very beginning the graphic interface has been skeptically viewed by programmers, soon it became synonymous with computers and considered a more natural way of getting in contact with the digital domain. The power of the graphical interface to pull the user into the virtual environment overshadowed the material interfaces used to manipulate it, focusing on the information space. On the other hand, wearable computers should be carried by the user, making the physical interfaces much more visible. Throughout almost two decades wearable computers have been awkwardly viewed, since the physical apparatuses used to interact with the user were not at all "transparent." The first wearable computers were heavy and clumsy, requiring too much effort from the user. The production of invisible and comfortable interfaces has been accomplished mainly since the late 1990s. The picture below shows the evolution of one of Steve Mann's inventions: from an awkward Head

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actualization on: 07 Jan. 1998. Available at: http://wearcam.org/acm-mm96/acm-mm96.html. Accessed on: 07 Sep. 2003.

Mounted CRT to a tiny and almost imperceptible interface in his belt together with a miniaturized multimedia computer built into his sunglasses.

Picture 26: Evolution of Steve Mann's "wearable computer" invention.

Wearable computers and transparent interfaces contribute to create more natural relationships with technology, including them in our everyday life without the need to really *perceive* them. Therefore, they become a part of our lives and also a part of our bodies. The miniaturization of interfaces might not be crucial, but it is surely a critical factor to the emergence of mobile communication devices.

6.4. Nomadic technology devices: combining mobility and communication

6.4.1. On some characteristics of the mobile interface

6.4.1.1. Ubiquity

Cell phones and other nomadic communication devices share some characteristics with ubiquitous and wearable computers, but also differ from them in other aspects. Nomadic technology devices are supposed to be small in order to be carried. Similar to wearable computers, they should be wireless in order to move freely through the physical environment. However, cell phones do not fit in Weiser's description of transparent technologies, because they require the full attention of the user. This feature is inherited from the telephone, whose ringing always demanded an interruption of any previous conversation or action in order to answer the call. As Marshall McLuhan (*Apud* Plant, 2001, p. 30) observed in **Understanding Media**, "an incoming call provokes a sense of expectation, even urgency," and therefore people usually feel compelled to answer a phone, even if the call is not for them. According to Sadie Plant, who developed a report on the social use of cell phones for Motorola, public use of mobile phones creates an additional tension, because only the person to whom the call is made is in a position to respond. This situation irritates many people, because they feel disconcerted by this new electronic soundtrack invading public spaces. Moreover, many people state that "just the knowledge that a call might intervene tends to divert attention from those present at the time," placing the cell phone always at the center of attention of a group (*Ibid.,* p. 30).

Plant (*Ibid.,* p. 31) creates three categories for the public reception of calls on cell phones. The first one she calls *flight*, which is characterized by the user immediately moving out of the group to talk in privacy. The second, *suspension*, is related to recipients who stay in the same place but stop whatever they are doing for the duration of the call. Finally, *persistence* describes users who try to stay engaged with the nearby context, as much as possible paying attention to what they were doing prior to the incoming call. All three situations are characterized by at least a minimum disconnection from the nearby context and the fear of close peers to be "abandoned" by the person who has answered the phone. However, this paradigm shifts. Cell phones do take people out of the nearby context, but also *bring distant people to the actual context*. This movement in and out of physical space promotes new types of sociability and communication patterns. Moreover, in places like Japan, Finland, and Sweden, cell phones largely changed their roles from personal communication devices to social communication interfaces, engaging nearby friends in the conversation with distant peers, thus promoting a larger "multiuser" experience.

Overhearing private talks in public spaces is frequently disturbing for many people. Consequently, cell phones have been placed on some public places' "black lists." There are restrictions on the use of mobiles in British, Japanese, Swiss, and American trains. "Restaurants in cities as diverse as Cairo and Chicago have introduced 'no-mobile' policies or 'mobile-free' zones in an attempt to maintain the senses of privacy and personal space which are considered crucial to their atmosphere" (Plant, *op. cit.,* p. 36). It's interesting to note though that signs of "silent rooms" in trains or other public spaces are only viewed where the technology has become ubiquitous. On the other hand, ubiquity also promotes familiarity with the technology. Artist and curator Sara Diamond[9] observed that in London's subway and buses, dealing with cell phones is quite normal. London citizens are traditionally introspective people, but it seems that the cell phone changed their way of dealing with public/private matters, for they talk openly about all (personal) topics in public places, says Diamond. In the UK, a research study conducted by Telecom Italia attested that as much as 1.1% of the population admit they try to listen to somebody else's conversation on a cell phone (Fortunati, In: Katz; Aakhus, 2002, p. 52). However, the same research states that 21.1% of UK citizens are annoyed by public use of cell phones, the highest percentage in Western Europe.[10] Likewise, most Germans disapprove of the use of cell phones in public spaces; 50.1% think "What a show!" when seeing somebody using their mobile phone in public *(Id.).* This reaction is connected to the old belief that mobile phones should only be used for emergency calls. As a result, many think people should refrain from using their phones in public, unless extremely necessary. Plant (*op. cit.,* p. 34) tells that "in 1988 a German business man died in a fight provoked by what was perceived to be ill-mannered use of his mobile."

Certainly ubiquity per se is not connected to mobility, but mobile devices can be ubiquitous, as long as they can be viewed and used anywhere. Technologically speaking, ubiquity can be defined as the ability to communicate anytime, anywhere via computer devices spread out in the environment. Ideally, this connectivity is maintained regardless of the location or movement of the mobile entity. This location independence should be available over a given area, which could be physically too large for any single wired medium, such as an Ethernet cable. Obviously, wirelessness enables greater ubiquity than is possible with wired media, especially when one is in motion. Moreover, many wireless hosts spread out over the environment allow the user to move freely around physical space, and always stay connected.

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[9] Interview to the author (17 Apr. 2003).

[10] Based on this fact, Crispin Jones associated with IDEO developed the piece **Social Mobiles**, analyzed next chapter, in order to criticize people who are annoyed by cell phones.

Broadening the meaning of the word ubiquitous beyond technological aspects, it means something "present, or seeming to be present, everywhere at the same time."[11] In this sense, cell phones are becoming ubiquitous. Recent statistics show that in many parts of the world cell phones surpassed the number of telephone landlines. In March 2004, for example, Brazil had 49.1 million cell phone users vs. 39.20 million fixed lines. Moreover in South America 53% of the population owns a cell phone, while 51% are fixed Internet users.[12] The fact that in 2002 there were more cell phone owners than Internet users in South America evidences an important shift from fixed to mobile communication. It is also possible to foresee that the more cell phones are equipped with mobile Internet capabilities, like remote access to information, location-based services, and multiuser communication, the more communication is transferred from "virtual space" to mobile and hybrid space.

Finland has one of the highest cell phone penetration rates in the world, with more than 90% of the population owing a mobile.[13] Furthermore in many countries where the development of the Internet and fixed telephone lines are not as widespread, cell phones are generally the first computer *and* the first telephone of many citizens. The ownership of a cell phone produces the feeling of being "always available" and connected to the world around, even if the connected places are not geographically close.

The main difference, thus, between nomadic technology devices and previous wearable and ubiquitous computing devices is the ability to communicate among people. Nomadic technologies, especially cell phones, do not only allow connection with digital data, but they also contribute to form new types of communities. In some parts of the world, like Japan and Finland, cell phones are no longer only two-way communication devices, which was the main characteristic of the traditional telephone. Kasesniemi and Rautiainen (In: Katz; Aakhus, *op. cit.,* p. 182) observe that in Finland, where the use of SMS is frequent, "the recipient of the message is generally unaware of the number of people involved in composing the message and the time spent in formulating it," because the message is usually sent under the sender's name only. They observed teenagers'

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[11] Source: Webster's New World Dictionary and Thesaurus. Fourth Edition. Cleveland, Ohio : IDG Books Worldwide, Inc., 2000. p. 1550.

[12] Source: Teleco. Available at: http://telecom.br/estatis.asp. Accessed on 17 May 2003.

[13] Source: International Communications Union (ITU, 2003). Available at: http://www.itu.int/ITU-D/ict/statistics/at_glance/cellular03.pdf. Accessed on: 17 May 2003.

behavior in buses and trains in that country, while using their cell phones. Most of the time, they had the device in their hands. When receiving a call, frequently the conversation was shared among the group. Also when writing SMS, they asked friends about the content and showed received messages to the group.

As long as cell phones become ubiquitous, they can also be regarded as tools, since they turn out to be so natural that one does not even perceive they are being used. As Meyrowitz (*Apud* Cooper, In: Brown; Green; Harper, 2002, p. 20) comments about the use of the traditional telephone, "speaking to someone on the telephone … is so natural that we almost forget about the intervening medium." In this sense, telephones are also transparent. Is the cell phone becoming a transparent interface like the telephone? Here we must distinguish between two meanings of transparency. One is the transparency proposed by Mark Weiser (1996), which is applied to a device which doesn't frequently require our attention and which can be in the background of our lives. Another meaning is related to tools that do not show up because they are functional, and their use is already embedded in our everyday lives. For example, when one talks on the phone the focus stays on the person on the other end of the line, not on the phone itself. Likewise, when one writes, the focus is on the words employed, and not on the pen itself—unless it is an uncomfortable pen, and then it does not exert its functional task. Both meanings of *transparency* are connected, since calm technology should be functional and tools should recede to the background when not in use.

6.4.1.2. Wearability

Part of the answer to these questions lies in the function of cell phones as wearable devices. Unlike wearable computers, nomadic technology devices are not meant to be worn. However, among all mobile communication technologies, cell phones are the closest to the body. They are generally placed in pockets, belts, or purses, becoming an indispensable accessory for everyday life. Yet Italian researcher Leopoldina Fortunati (In: Katz; Aahkus, *op. cit.,* p. 46) inquires whether mobile phones are really portable technologies. "If we look at the phenomenology of its use, its position on the surface of the body is both precarious and uncomfortable." He argues that the difficulty in finding an appropriate place for the cell phone on the body limits its wearability because "the tendency is to free it from its new place at the earliest opportunity and put it somewhere else" (*Ibid.,* p. 47). For example, it is common to leave cell phones on tables in restaurants, bars, or trains. The impact of this "placeless" cell phone could be computed by the London's Lost Property Office, which reported that mobiles have replaced umbrellas as one of the most frequent turned-in items between April 2000 and March 2001![14]

Studies on the design of cell phones try to make them more "wearable" or to adapt clothes to carry them. Fortunati *(Id.)* also mentions that Nokia "has teamed up with a European fashion house to create clothes specifically designed to incorporate mobile communication technologies." Also the IBM pervasive computing division[15] explores ways to make technology wearable and kept closer to the body. One of their prototypes includes a wearable "jewelry" cell phone. It consists of a pair of earrings, a necklace, a watch, and a ring that at first glance look like ordinary jewelry. Reporter Tom Spring (03 Nov. 2000) explains how it works:

> When you get a call, a tiny light starts blinking on your ring. The phone number of the person calling is displayed on the watch. You answer the phone by pressing a button on your watch. Next, you hear the call through your earring, which has a tiny speaker embedded in it. You then speak to the necklace, which has a tiny microphone inside and acts as a mouthpiece.

Current research on fashion and technology tries to make new devices more embedded in the body and personalized, enabling information access anywhere, anytime.[16] Yet even while IBM develops prototypes, wearable cell phones are already available in Japan and Europe. The Japanese *keitai*[17] is certainly not only a phone; it is also a personal item and part of the identity of many young teenagers.[18] Plant (*op. cit.,* p. 44) comments that "in many parts of Pacific Asia, girls wear their mobiles as functional jewelry: in Bangkok they are carried in fur-edged plastic pouches worn as necklaces." Recently NTT DoCoMo, the main mobile communication company in Japan, launched not a wearable device for carrying cell phones, but a wearable cell phone: a wrist phone.

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[14] See Tfl Lost Property Office Web site for interesting statistics. Available at: http://www.tfl.gov.uk/tfl/ph_lpo_stats.shtml. Accessed on: 17 Dec. 2003.
[15] See http://www-3.ibm.com/software/pervasive/index.shtml. Accessed on: 17 Dec. 2003.
[16] The Fashion and Technology show on Siggraph 2003 (San Diego) explored these issues, including an electric shock jacket from the Wearable Computing Group at MIT and special garments to accommodate cell phones.
[17] *Keitai* is the word for cell phone in Japan, which roughly means "an extension of one's hand."
[18] For more information on cell phone culture in Japan, see chapter 7, **Cell phones and places.**

Besides being a portable phone, the **Wristomo** opens into a standard handset shape. Like most good watches, it is waterproof. Furthermore, it sends and receives e-mails, and is provided with a location-based service that informs the user about restaurants, weather, and transportation, depending on the user's current location. The **Wristomo** is not based on I-mode 3G standard,[19] but, according to journalist Anthony Newman (10 Apr. 2003), "it is an important step in making PDAs and phones—and their connectivity—'ubiquitous' like watches." As technological innovations never come alone, almost simultaneously Samsung released the first GPRS[20] watch phone in Europe. Samsung's phone is based on GSM,[21] the European standard for mobile communication. Measuring 37.8 x 64 x 17.7 mm, the phone was scheduled to go on sale across Europe at the end of 2003 as the world's smallest GPRS phone in the Guinness list. Both **Wristomo** and Samsung's watch phone represent an attempt to make mobile communication more wearable and available, without being uncomfortable. "With your phone strapped to your wrist, you never have to worry about leaving it behind," comments Newman *(Id.).* It is still early to predict whether cell phones are going to migrate from handsets to "wristsets," but definitely they are becoming fashion-oriented, personalized, and smaller items.

[19] Third Generation Cellular System. "Third Generation Cellular Systems include the possibility to offer data services without the need of establishing a connection (permanent connection) and speeds up to 2 Mbps. The main systems are WCDMA and CDMA2000 1xEV. The ITU refers to 3G as IMT-2000." Available at: http://www.teleco.com.br/glossario.asp?termo=3G. Accessed on: 10 Jan. 2004.

[20] GPRS, General Packet Radio Service, is a "system that can be implemented as a layer over GSM systems. GPRS allows data services without the need of establishing a connection. It is considered an intermediary step (2,5G) to the third generation of cellular systems (3G)." Available at: http://www.teleco.com.br/glossario.asp?termo=GPRS. Accessed on: 17 Dec. 2003.

[21] GSM, Global System for Mobile Communication, "originally known as Group Special Mobile, is a second generation digital cellular system developed in Europe and used in the majority of the world. Initially developed to the range of 900 MHz, GSM had afterwards a version adopted to 1800 and 1900 MHz." Available at: http://www.teleco.com.br/glossario.asp?termo=GSM. Accessed on: 17 Dec. 2003.

Picture 27: NTT DoCoMo **Wristomo** and
Picture 28: Samsung GPRS wrist phone.

Sara Diamond[22] argues that despite cell phone manufacturers' concern with the device's design, frequently an emphasis on aesthetics leaves functionality on a second plane. For example, internal antennas decrease reception quality and smaller handsets have less durable batteries. However, *wearability* is critical to transform cell phones into ubiquitous interfaces, with all the characteristics a ubiquitous device might have: transparency, popularity, omnipresence, and pervasiveness. As Fortunati (*op. cit.,* p. 48) argues, "if the Walkman 'dresses' the ear, and microchips remain inserted in the body for long periods, the mobile involves not only the ear, but also the mouth and voice." When it is not being used, the mobile phone generally stays close to the body most of the day.

The popularity of cell phones over other nomadic technology devices, like laptops and PDAs, is due to their portability—and price, naturally. As researcher Sadie Plant (*op. cit.,* p. 26) notes, they are especially popular in Japan because people are used to living in confined spaces, "which makes them reluctant to own or carry something as large and heavy as a laptop, but delighted to pocket a small, light, multifunctional *keitai*." Even in other places around the world, as long as cell phones acquire other functions beyond that of the traditional telephone, they tend to substitute other nomadic devices, because they are easier to carry and more affordable.

[22] In an interview to the author (17 Apr. 2003).

6.4.1.3. Immersion

Although cell phones might be easily forgotten, while in use they can be really demanding. It is common to hear comments about people who spend more time talking on the phone than interacting with others in their vicinity. Therefore, mobile phones are frequently considered non-sociable media. Howard Rheingold (2002, p. xxii) observes that on trains and buses passengers prefer to talk to somebody who is physically absent than with other people who are in the same vehicle. Yet that is not a big deal, for since the emergence of the train as a transportation technology, communication inside the wagon has been awkward, leading to the habit of reading during the trip[23] (Schilvelbusch, 1986, p. 75). With the further development of advanced transportation technologies this situation did not change. However, cell phones create different communication patterns, which could not be observed before, for example, the enfolding of contexts when walking on the street. The first popular experience of enfolding contexts while moving through space was perceived with the Walkman in the early eighties (Hosokawa, 1997), but these folded contexts were not connected to two-way communication. The Walkman mixed the present context of the urban environment with a soundtrack that did not belong to it, but was particular to the person who wore the device.

Interestingly, many issues raised by the widespread use of the Walkman as a wearable technology are applied to cell phones today. For example, Hosokawa *(Ibid.,* p. 7) inquires whether or not using the Walkman implies a loss of contact with reality. While walking through space, the Walkman listener is in a world whose sounds do not correspond to the environment she sees. The ability to choose the soundtrack to the world also isolates the listener from contact with other people in the vicinity, and the physical environment becomes a background to the listener's thoughts. According to Hosokawa *(Ibid*., p. 21),

[23] See chapter 5, **Defining Hybrid Spaces**.

> The practical meaning of the Walkman is found in the distance that it creates between the reality and the real, the city and the urban, and mainly between the other and the self. The Walkman destroys the context of the city, and promptly places any incoherent situation in its context.[24]

Due to its ability to isolate users from interpersonal interaction in public space, the Walkman technology provoked a lot of public debate (Licoppe; Heurtin, In: Katz; Aakhus, *op. cit.,* p. 99). Although cell phones are communication devices, many times they have also been regarded as responsible for taking people out of the physical environment and isolating users. Differences from the Walkman, however, are many. First, mobile phones are generally used to interact with other people. Second, mobile phone interactions are unexpected, while the Walkman has a constant behavior while on. Furthermore, interaction with the cell phone is not only limited to incoming calls, but can also include nearby peers. Conversely, cell phone screens, displaying all sorts of games, personal assistance, and the Internet, turn the mobile phone into a highly immersive device.

Machiko Kusahara,[25] professor at the Waseda University in Japan, tells a story about a man waiting for a train in the Tokyo subway. He was so immersed in his cell phone screen that he unconsciously crossed the security line of the subway toward the rails, and did not realize when the train came. By a fraction of seconds he was not hit by it. This story raises some issues. First, does immersiveness depend on the screen size? Technically speaking, suggests Erkki Huhtamo,[26] professor on media archeology at UCLA, immersion is defined as an exclusion from the surroundings, in a situation where the user does not see the borders that separate the digital and the physical environment. The cell phone, in turn, has a clear frame that is defined by the tiny screen. Therefore, there is no way of applying the traditional immersion concept to the cell phone. However, "what is the feature in the cell phone that may exclude the surroundings so powerfully?" questions Huhtamo.[27] How does the cell phone screen compete so successfully with the

[24] *Die praktische Bedeutung des Walkman besteht in der Distanz, die er zwischen der Wirklichkeit und dem Realen, der Stadt und dem Urbanen und insbesondere zwischen den Anderen und dem Ich entstehen lässt. Er zerstört den Kontext des bestehenden Textgefüges der Stadt und stellt gleichzeitig jedwede zusammenhanglose Situation in einen Kontext.*
[25] In an interview to the author (16 Jan. 2003).
[26] In an interview to the author (15 Dec. 2002).
[27] *Id.*

urban background? According to critical theorist Norman Klein,[28] "there's no longer need of the screen, because the real world around us has become the screen." Klein believes that when people talk on the phone while walking, they just move through the space, but they are not actually there. Moreover, this absent presence transforms physical space into a non-place, because people do not interact with anyone in their vicinity. Therefore they become walking avatars. An avatar is one's representation in a space in which one is not. This perspective, Klein says, "generates a culture of tremendous paranoia and isolation. The more we promote an invasion of privacy in public spaces, the more we make ourselves isolated from the world around us."[29]

There are two opposing ways of looking at cell phones: one, following Klein, considers them as technologies that promote isolation. The other regards mobile phones as technologies that enhance communication. According to Norman Klein, nomadic technology devices detach us from the physical world around, projecting our presence in virtual spaces. Conversely, in physical spaces we are represented by many disembodied distributed presences, like answering machines. For Klein, we increasingly live in virtual spaces.

Given this fact, the second question is, does immersion depend on the screen itself? The man with the cell phone in Tokyo could have been reading a newspaper or a book, and the level of "disconnection from the present context" would be the same. Similarly, while playing a game, even if the screen is small like in a **Gameboy,** the level of disconnection with the surroundings might be really strong. Therefore immersion does not depend only on our vision, but also on touch, smell, and sounds. Most of all, immersion depends on imagination. Like the Walkman user that "reinvents" the city soundscape by replacing its original soundtrack with the sound of the Walkman, the cell phone user also reinvents urban spaces, no longer disconnecting from them, but connecting in a different way.

In any case, what we learn about mobile communication technologies is that they simultaneously change our communication patterns and also transform our relationship to space. Therefore, there is no point in discussing whether cell phones take us out of

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[28] Interview to the author (08 Nov. 2002).
[29] *Id.*

physical space or promote sociability among nearby users, because the space in which communication happens is no longer physical *or* virtual; it is hybrid. A hybrid space encompasses both instances in one, enfolding contexts and connecting people who are distant *and* close.

6.4.1.4. Presence

Nomadic technologies also change our sense of *presence*. Presence has always been an important concept in virtual environments, to the extent that the creation of an avatar has been required to represent one's body in the digital world. The avatar is the interface of an absent physical body. Kenneth Gergen (In: Katz; Aakhus, *op. cit.,* p. 227) exemplifies other types of technologies that have the power to exclude us from the environment in which we physically are, such as the Walkman, books, computer screens, and telephones. For him, these are technologies that promote an absent presence, for when talking on a cell phone, for example, "one is physically absorbed by a technologically mediated world of elsewhere" *(Id.).* This statement is partially true, especially regarding fixed telephones, but it is also important to consider two additional things. First, the fact that one is absently present in this context might mean that she is presently absent in another context. Fortunati (*Apud* Rheingold, 2002, p. 195) believes that "the ambiguous dimension of presence/absence in space also means the restructuring of the sense of belonging to a place." Therefore, the feeling of *belonging* to one's communicative network is no longer dependent on a specific place or physical presence, but on space and message exchange. Interestingly, researcher Mizuko Ito (*Apud* Rheingold*, op. cit.,* p. 6) observed that Tokyo "thumb tribes" consider themselves "present" at a gathering if they are in touch via SMS. "As long as peers participated in the shared communication of the group, they seemed to be considered by others to be present." This distributed presence allows users to participate physically in one social event, while being "in communication" with people at another social event, creating a double social network, and the ability of being "present" in both places. As I mentioned in chapter 4, some characteristics of the double sense of presence can be already perceived in telepresence and telematics' artworks, when exploring the power of telecommunications in making us present in places where we are physically absent. However, none of them included mobility like the one promoted by the cell phone

Second, we must consider a very peculiar characteristic of mobile phones, especially in Scandinavian countries and Japan: communication that takes place in the contiguous physical environment. Mobile phone screens differ from movie theater's screens, for example, by the fact that they are *embedded* in the environment. A completely separate environment, similar to a black box, must be created in order to watch a movie on a theater screen, to disconnect it from the physical world around us.[30] A similar situation has been produced by the TV, which generally occupies a specific place inside one's house. The goal of these screens is to disconnect the spectator from the nearby context. While watching TV or seeing a movie, generally no conversation occurs. Conversely, cell phone screens are embedded in the physical world, they are mobile, and they travel around attached to the user. Although they can also promote immersion, frequently it has been noticed that the "shared use" of cell phone screens promotes communication and interaction among people who inhabit the same physical environment. Alexandra Weilenmann and Catrine Larsson (In: Brown; Green; Harper, *op. cit.,* p. 95) developed a study on local use and sharing of mobile phones in Sweden and concluded, among other things, that

> the remote communication, i.e., the phone calls they (teenagers) receive or make, as well as the SMS messages they receive or send, are accounted for in the ongoing local interaction. Teenagers thus share the communication they take part in with their co-present friends.

6.4.1.5. Sociability: creating multiuser environments

In the aforementioned mobile interaction, not only the communication as an abstract entity, but often the phone as a physical medium is shared. Therefore, cell phones become no longer "private" objects, although they can be very personal. Via several examples, Weilenmann and Larsson (*Ibid.,* p. 98) show that cell phones in Sweden are often shared to enable a whole group to talk to a remote person. "Instead of one person talking and 'shielding' her/himself from the group while doing it, everyone present involves themselves, and are allowed to involve themselves in the ongoing

[30] In chapter 8 I shall show how the same situation is created by the traditional museum's white cubes.

conversation." Thus the mobile becomes a collaborative resource for teenagers, rather than a private phone. Mainly allowed by the widespread use of SMS in Scandinavian countries, the social communication promoted by cell phones is much more than merely a group communication. Enfolding distant contexts into the present context and involving groups of people who communicate in a "virtual" environment reconfigure physical space as a multiuser environment, creating communities of people who (do not) share the same contiguous space.

Furthermore, in this new type of multiuser environment, embodiment is indeed important. In former chapters I discussed the importance of physicality when connecting to digital environments. The creation of an avatar corresponded to this embodiment, accomplished by a digital (non-physical) representation of the body. When it comes to nomadic technologies, the body is critical, for it is the physical interface to which the technology is "attached."

While cell phones still cannot be regarded as "wearable" devices, they are definitely viewed as extensions of the body, mainly the extensions of one's hands. Sadie Plant (*op. cit.,* p. 23) shows that except for the U.S. (and other countries in Latin America) where cell phones are called after the technology that produces them, in almost all parts of the world their names are connected to mobility, hands, and portability. For example, in French it is called *le portable*. Finns name it *kännykkä* or *känny*, which refers to an extension of the hand. Also in Germany a cell phone is a *handy*. In Spanish, *le movil*. She goes further, telling that:

> In Arabic it is sometimes called *el mobile*, but often a telephone *sayaar*, or *makhmul* (both of which refer to carrying)…. In Thailand it is a *moto*. In Japan it is *keitai denwa*, a carried telephone, or simply *keitai*, or even just *ke-tai*. In China it is *sho ji*, or 'hand-machine.'

The passage from *cellular phone* to *mobile* or *handy* shows a transformation from a technological to a personal device. It represents the moment when the technology is no longer just a tool, but a part of ourselves, part of our identity.

6.4.2. On the consequences of a mobile interface

6.4.2.1. Mobility and imagination: enfolding contexts

Erkki Huhtamo[31] argues that understanding cell phones urges us to look at early stages of mobile technology, which include the history of portable sound. More than a technological history, it is a history of imagination, and of imaginary devices that were never really implemented. Early mobile sound devices included, besides car radios in the 1940s, bicycle radios, radio bracelets, as well as hybrid devices that combined radio and photographic apparatus in the beginning of the last century. Reasons why the radio + camera did not succeed are unclear, but it might be due to the inability to send the pictures after they had been taken. While the combination with the camera did not succeed, portable radio devices have been a great success. Portable communication, however, until recently has been successful only in imaginary realms. Huhtamo[32] also suggests that imaginary visions develop more slowly than the technology itself, what means that even though new technologies arise, present fantasies might come from earlier times. Conversely, fantasies from earlier times produced never implemented technologies. The wrist phone used by the cartoon character Dick Tracy included features like image transmission that are only being implemented now, mainly via the novel wrist phones developed by NTT DoCoMo and Samsung. Other technologies remained successful only in fiction, while in reality they did not really work, like the videophone. Brown and Green (*op. cit.,* p. 9) tell that in the 1970s AT&T spent over 500 million dollars to develop the videophone. However, by 1973, there were only 100 public videophone subscribers. Therefore, according to Huhtamo, there is no synchronous mode between the history of the imagination about technology and the history of technological development.

Cell phones transform (urban circulation) spaces into (social) places both by enhancing communication among people who are close in physical space, as well as by extending communication to hybrid spaces. Both cases involve communication with people who are not sharing the same contiguous physical space, and both cases change

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[31] In an interview to the author (15 Dec. 2002).
[32] *Id.*

our perception of space by enfolding distant contexts into the present context. The enfolding of spaces promoted by cell phones nourishes people's imagination about distant contexts and worlds. There are always two contexts involved in a cell phone (or telephone) conversation. According to Plant *(op. cit.,* p. 47), "to overhear a conversation is to listen in to one of these worlds. To overhear just one of its sides is to be neither fully admitted nor completely excluded from its worlds." A young teacher in Chicago admits that, because she could not hear both sides of a conversation, she frequently found herself drawn into speculations about the missing sides of the dialogues in an attempt to fill the gaps *(Id.).* As has been discussed in chapter 3, distant and unknown places are responsible for nourishing people's imagination. However, if distant places have been formerly brought into awareness by the character of the traveler, now mobile phone users are responsible for enfolding distant contexts into the present context, creating new realms for the imagination. Unlike travelers, mobile phone users do not need to tell tales about non-present places, since their conversation, overheard in public spaces, is already a narrative about other spaces in the minds of nearby people. Moreover, as strangers generally know nothing or very little about the person who is talking on the other side of the phone, they can imagine whatever they want about the spoken topics. This situation is different when considering shared cell phone use among teenagers. In these circumstances, the distant context is a present part of the nearby context.

One can argue that fixed telephone calls also enfold distant contexts into the present context, nurturing imagination. However, generally fixed phones (except pay phones) are not used in public spaces, restricting the number of people who might overhear a conversation, and fixing the context in which the conversation happens. A home phone, for instance, is used by family members whose contexts are not completely unknown to each other. Conversely, the mobile phone user is generally in motion, so calls are received in quite different contexts. The mobile enfolding of contexts is also connected to a technology that is necessarily *embedded* in the environment and part of other contexts. For example, "in Tokyo, people are expert navigators of busy city streets, railway platforms, and subways while keeping an eye on their *keitai*. In Beijing, the new skill is more likely to involve riding a bicycle while making and taking mobile calls" (Plant, *op. cit.,* p. 50). The mobile phone creates a culture "in-between."

The most common question at the beginning of a phone call, “Where are you?” is not only a practical question, but also an attempt to *contextualize* the conversation, trying to imagine where the other person might be. This was not at all an issue with fixed telephones, because the context was always already given. Furthermore, fixed phone lines are connected to places, and not to people. Similarly, IP addresses on the Internet are connected to servers, not to people. One person can use many different hosts, but a brief look at the IP numbers reveals from where a message has been sent. Conversely, mobile phones have no fixed location. Cell phones decontextualize the conversation, and demand its recontextualization. As a result, while fixed telephones and the Internet connect people in a virtual space, cell phones bring this virtual conversation place into physical space, creating a hybrid environment.

6.4.2.2. Mobility and space: public, private, and (non)surveillance

The physical location of a cell phone is always an unknown geographical position for those on the other end of the line. In addition, the fact that the cell phone has become a personal item frequently represents for teenagers freedom from parents’ surveillance. It is true that many parents give cell phones to their children in order to monitor their activities, or to make them “available” all the time. Nevertheless, one can always lie about one’s physical location, and choose whether or not to answer a call depending on the number displayed on the screen.

The existence of one common fixed telephone line in a house enabled members of the family to answer calls to other members and therefore possibly “monitor” who was calling whom. It was possible to have an idea about who was on the other side of the line and sometimes overhear conversations, if the phone were in a common place of the house. “Mobile phones do not allow this type of mutual surveillance anymore. For many teenagers this is the technology of freedom, while for many parents it is the technology of losing control” (Kim, In: Katz; Aakhus, *op. cit.,* p. 73).

Consequently the traditional perception of public and private spaces is changed. Much has been asked about whether cell phones privatize public spaces or publicize private spaces. This is the same case of whether the cell phone is responsible for taking one in or out of physical space: The borders have been blurred and it is hard to define what is private and what is public. Is a cell phone conversation on public transportation publicizing one's private space? Or is the phone user privatizing the public space of the bus? What is the difference between a conversation on a cell phone and a conversation with the person that is seated beside you? Is it different because the other person in the cell phone conversation is not physically present?

Kenneth Gergen (In: Katz; Aakhus, *op. cit.,* p. 230) splits communication interfaces in two categories: monological technologies and dialogic technologies. The first ones, which include TV, radio, and film, that is, broadcast mediums, bring public into private. The TV in a house functions as a window opened to the world. They insert outside voices into daily life circumstances, but there are few means by which one can respond to them. On the other hand, dialogic technologies include telephones, and cell phones. These interfaces, according to Gergen, privatize spaces in the sense that the incoming outside voices are generally just available to one person at a time. Gergen (*Ibid.,* p. 236) suggests that the emergence of advanced communication technologies like the telegraph in the past century promoted an erosion of face-to-face communication. Interestingly, "when the telephone entered cultural life early in the twentieth century, it primarily served as an extension of face-to-face relations." The Internet can function both as a monological technology—when used to access information—as well as a dialogic medium—when used for two-way and multicast communication. Nevertheless, the Internet has rarely been regarded as an extension of face-to-face communication. Due to the possibilities of reinventing the self and assuming "multiple identities," it was more like hiding oneself under the barrier of the interface than extending "real" communication.

Cell phones also play an important role in creating a private space for teenagers in Japan. As Japanese people are used to living in very small places and sharing one phone line with the entire family, the ownership of a cell phone creates a private space for communication. As Rheingold (*op. cit.,* p. 4) observes, "in Japan, adding wired telephone lines to home is expensive, but it is less expensive for teens to have their own personal mobile numbers." Also because much of the communication is accomplished via text, other members of the family are not able to overhear the conversation. This fact might partially explain why cell phones in Japan are so popular among teenagers and why the same is not true in the U.S. In the United States, families tend to live in bigger houses. Also, landlines are very cheap and frequently one family house has more than one fixed line, allowing each member of the family to have their own private line. Privacy in the United States does not depend on the new mobile interface. Researcher Mizuko Ito (*Apud* Rheingold, *op. cit.,* p. 22) notes that

> Americans move between private nucleated homes, private transportation, and often private offices and cubicles as well, with quick forays in the car to shop occasionally (not daily grocery shopping as in Japan), and use of public space and restaurants has the sense of an optional excursion rather than a necessity.

In Brazil, taking the case of the middle and upper classes, the situation is similar. Most residences have at least one fixed phone line, homes are bigger, and frequently each family member has his or her own room.

Although cell phones can be used differently in diverse parts of the world, they promote this blurring of borders between public and private spaces: enfolding the private within the public, bringing the public to the private, and creating private/public mobile islands. Especially among teenagers, mobile phones are not only instruments to build their privacy, but also enforcements of their social public identities. Sadie Plant (*op. cit.,* p. 45) argues that youngsters without cell phones "can feel—and really be—excluded from the social networks to which their friends belong."

6.4.2.3. Mobility, micro- and macro-coordination

Another important consequence of the widespread use of cell phones is the ability to microcoordinate. Microcoordination is the result of a series of short phone calls in order to establish appointments and update others of real-time events. In the past, one was only available for communication while in the office, at home, or close to a landline phone. Nowadays, with the possibility of being always available, scheduling and rescheduling appointments becomes easy. De Gournay (In: Katz; Aahkus, *op. cit.,* p. 194) points out three characteristics of the mobile interface: reachability, immediacy, and mobility:

> Immediacy is an advantage common to both the mobile and the corded telephone. Reachability is an advantage of the mobile phone but it depends on the cooperation of its owner, because, if he or

she is unavailable, the result is the same as with a corded phone. Mobility is unquestionably the distinguishing characteristic.

Microcordination depends on the three characteristics working together. In Korea, Shin Dong Kim (*Ibid.,* p. 70) attests that there has been a change in the way people schedule appointments. If before appointments were generally scheduled weeks in advance so people could organize their schedules, after the cell phone the coordination time became much more dynamic. Kawamura (*Apud* Rheingold, *op. cit.,* p. 5) suggests, "Kids have become loose about time and place. If you have a phone, you can be late." Microcoordination not only affects users' perception of time, but also the perception of public spaces. First, the use of cell phones for microcoordination spreads out and diversifies meeting places. Second, it is used to coordinate instant gatherings and "flash mobs" in specific sites of the city. Third, it can be used to develop imaginary spaces over the city space, as in the case of pervasive gaming.

Rheingold in his book **Smart Mobs** (2002, p. 157) already pointed out the power of cell phones in the macro-coordination of political actions, as in the case of President Estrada in Manilla. However, another phenomenon related to macro-coordination occurring in the United States has been called "flash mobs." It consists of dozens or even hundreds of people with cell phones who gather suddenly, perform some specific but innocuous act, and then promptly scatter. Journalist Rob Walker (24 Aug. 2003) tells that in August 2003, "a mob formed at Toys 'R' Us in Times Square, stared at an animatronics Tyrannosaurus rex, then fell to the floor with screams and a waving of hands before quickly dispersing." These weird actions are taking place in San Francisco, Minneapolis, London, and Berlin, and are getting attention partially because they are weird, and partially because they are organized via cell phones, pagers, and Web sites.[33]

6.4.3. On the developments of the mobile interface

6.4.3.1. From emergency calls to social networks

Michael Benedikt (2000, p. 34) points out that until the 1940s the telephone, which is now taken for granted as a conversational device, had been envisioned merely as

[33] Flash mobs are just one example of social coordination via mobile phones. Other examples more directed to games are analyzed in chapter 9.

a different type of telegraph. Hence people only used telephones for important messages, and would hang up as soon as the essential message was relayed. Similarly, cell phones have also been viewed as "urgency" devices. We have frequently heard that cell phones were just useful for emergencies or urgent messages, and that is why they should be carried around all the time. With cell phone development, however, we realize that cell phones not only are evolving in the same direction as landline telephones, being used for long conversations, but are also used as a mix of pager (SMS), digital camera (camera-phone), video camera, personal organizer (PDA), mobile Internet (WAP), and game device.

As occurs with every new interface, it will take a while until users can figure out the power and the meaning of the cell phone as a nomadic technology device. In the early times of cell phone development, for example, many people used to consider it a cordless traditional phone, thus keeping their mobiles at home, like a replacement or additional fixed phone. Leopoldina Fortunati (In: Katz; Aahkus, *op. cit.,* p. 47) wrote that European research (at Telecom Italia in 1996) "found that one owner out of five never used their mobile phone outside the fours walls of the house." This fact is easily understandable from a historical perspective about former uses of past new interfaces and communication mediums. For example, Janet Murray (1997, p. 66) comments that early film was viewed as a mix of theater and photography, and it had been called photoplay (photo + play). This concept consistently influenced earlier film aesthetics, in which the camera was generally statically placed at the movie scene, like an observer who was watching a play in a theater. Much later, shooting alternatives with cuts and close-ups were developed, really exploring what the camera could do. The development of digital graphic interfaces followed a similar trend. How to represent space on the Web and how to create digital environments has always been closely connected to how we conceptualized the "virtual" space. For many years, the GUI as a desktop metaphor has been synonymous with virtual space, and obviously that representation influenced our perception of digital space as a simulation of the physical world: a virtual desk, virtual paper, and a virtual pointing tool. Today, however, research on user interfaces at Xerox PARC aims to envision new techniques for people to interact with large information environments. They argue that

> Traditional Graphical User Interface (GUI) techniques forces users to use Windows, Icons, Menus, and Pointing device to interact with the computer. User interfaces for these are largely derived from the standard overlapped-window Xerox PARC model of 25 years ago or before and reflect the constraints of the time, whereas computer processors and memories have advanced by four orders of magnitude and the understanding of the human cognition, human-machine communications, and neuroscience have also advanced. [34] (User Interface Research @ PARC, 2001)

Furthermore, knowledge about digital interfaces has greatly increased, allowing researchers to conceptualize the information space and develop better modes of human interaction with digital spaces. The same is true for the cell phone. Even if not considered a "replacement for the cordless phone" cell phones have been attributed specific functions, in order to acquire meaning as a new interface. Considering mobile phones as "emergency" devices is one example. Talking in public on a cell phone was not considered polite and their use was justified by answering extremely important and urgent calls.

The use of the mobile also differs depending on users' ages. Recent research (Ling; Yttri, In: Katz; Aakhus, *op. cit.,* p. 147) shows that the oldest users still focus on issues of safety and security. Middle-aged users focus on the coordination potentials of the system, like microcoordination and appointment calls. Finally, youngest users have the most distinct profile, using the cell phone as an expressive medium for social purposes. Therefore, younger users actually discover new meanings for the interface and explore new usage possibilities. According to Tom Sandage (*Apud* Rheingold, *op. cit.,* p. 1),

> Because it used the same wires, the telephone was originally seen as merely a speaking telegraph, but it turned out to be something entirely new. The same mistake is already being repeated with the Internet. Many people expect the mobile Internet to be the same as the wired version, only mobile, but they are wrong… Instead, the mobile Internet, although it is based on the same technology as the fixed-line Internet, will be something different and will be used in new and unexpected ways.

[34] Available at: http://www2.parc.com/istl/projects/uir/. Accessed on: 10 Jan. 2004.

6.4.3.2. From telephone to remote control, and game device

The first public call from a cell phone was completed 30 years ago. In 1973 Martin Cooper, a Motorola researcher, called a public phone from a cell phone in New York (Fontoura, 03 Apr. 2003). However, the first model of cellular phone authorized for public use was only released 10 years later, in 1983. It was Motorola's DynaTAC 8000X. At that time, consumers paid as much as four thousand dollars for the device. Looking briefly at the old model, it seems silly that today people discuss portability concerning the tiny existing cell phones. The first cell phone could be *mobile*, but it was definitely not easily carried. The device weighed around 1 kilo, and was 25 cm x 3 cm x 7 cm. The battery lasted twenty minutes in a conversation. Nevertheless, it was a great development compared to the car phones existing since 1940, the only type of current mobile communication technology.

Picture 29: Motorola Dyna-Tac 8000X.

If cell phones have been on the market for twenty years already, why did they just become so popular in the last four or five years? As I show in the next chapter, the history of cell phones is considered a history of (non)development (Brown; Green, *op. cit.,* p. 7). Technology to produce mobile phones has existed since the 1940s. However, it took 30 years to make the first phone call, and ten more years to commercialize the mobile devices. Then, fifteen years passed until mobile phones were culturally assimilated. Since 1997/1998 cell phones' ownership started to grow all over the world. This development is partially related to the commercial growth of SMS since 1999. Also the I-mode standard in Japan in 1998, followed by the emergence of the first camera phones, contributed to the success of the mobile. The triumph of the cell phone is based on the fact that it is no longer just a phone. Countries in which mobile phones have the highest penetration rates (East Asia and Scandinavian countries) do not use cell phones only for talking, but rather cell phones are mostly used to send messages and e-mails, and to access information on the Internet.

- *SMS*

SMS has been incorporated into the mobile phone since 1992. The first text message saying "Merry Christmas" was sent by engineer Neil Papworth to his colleagues at Vodafone, from a PC to a mobile phone, on the Vodafone GSM network in the UK (BBC News, 03 Dec. 2002). But it wasn't until 1999 that text messaging really took off, when mobile phone companies allowed users to send SMS to people signed up with other networks. Since then, SMS has been a great success, frequently being used as the main function of a cell phone. In 2002, 70% of mobile phone owners already used SMS *(Id.)*. Carrying the function of old pagers, SMS consists of sending short text messages to another cell phone. An SMS message has a maximum length of 160 characters, or about 20 words. The advantages of SMS over voice in a cell phone are many. First, like e-mail, they do not require an instant response.[35] Second, they allow people to communicate in silence, fulfilling an etiquette requirement in several public places in which people are not allowed to speak aloud. The disadvantages are related to the difficulty of writing a text using cell phone keys, which have no similarities to a computer keyboard,[36] and the short length of the message. The popularity of SMS in Scandinavian countries, like Finland and Sweden, led to a different way of understanding cell phones and relationships among users. Also SMS contributed to transform cell phones into shared

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[35] This statement is partially true, especially if we consider teenager culture in some countries of Asia and Europe. "Leaving an SMS message unanswered is almost without exception interpreted as rudeness.… The most often stated time limit for an acceptable delay for a reply is 15-30 minutes" (Kasesniemi; Rautiainen, In: Katz; Aahkus, 2002, p. 186).

[36] Experiments in order to incorporate QWERT keyboards to nomadic devices are in progress. Several options are already available on the marketing, such as folded keyboards that can be carried and connected to the Palm or the PDA in order to help typing. NTT DoCoMo Ubiquitous research focuses on the development of a wearable keyboard that can be worn 24 hours a day. (see http://www.nttdocomo.com/corebiz/ubiquity/index.html) The device tracks fingers' movements and detects intended key depressions on any surface. Furthermore, the Canesta Keyboard (see http://www.canesta.com/products.htm) is the world's first projection keyboard capable of being fully integrated with any mobile device. Still a prototype, it functions by inserting a chip on the nomadic device that projects a keyboard in any surface. According to the company, this keyboard "resolves the 'missing link' with mobile and wireless devices—the ability to true data input."

and social devices, because the messages can be shown to each other and written in a group.

The development of Internet e-mails already raised many questions about whether or not we are going back to a text culture. Originally long-distance communication was spanned by letters, and then by the telegraph, using primarily text form, rather than voice. With the telephone, communication shifted back to speech and away from text. After the Internet, however, e-mails, UseNet, and e-groups emphasized again written text over the spoken word.[37] Cell phones began as telephones, and voice was the principal communication medium, but they quickly shifted to include text communication. Today, in many countries, the use of SMS represents the primary use of cell phones. For example, in Norway in 1999 and 2000, 75% of girls and 62% of boys said they used their cell phones to send SMS, against 56% of girls and 50% of boys that used it for calling, or 11% and 19%, respectively, for WAP browsing (Skog, In: Katz; Aahkus, *op. cit.,* p. 262). The more users make use of text on their cell phones, the less they need the phone portion of the handset (Newman, 29 Aug. 2003). However, the main social disadvantage of text is that it effectively isolates both parties. Indeed, researchers affirm that one of the reasons for the extreme success of text messages in Finland and Japan is due to the fact that the populations are not so open to face-to-face communication.

SMS messages, like e-mails, differ from traditional letters. Stylistically, they are much more informal. Also they require the development of specific words or jargons to adapt to the speed and immediacy of the messages. A Finnish boy said, when his group sends SMS messages to one another, they do not use spaces between words (to save characters). In order to know where a word begins or ends, they write every other word in lower case and every other in upper case. In addition, they abbreviate words and they use the German umlaut (ü) to represent a smile, because it uses just one character, instead of two—:) (Kasesniemi; Rautiainen, *Ibid.,* p. 184). The ephemeral nature of SMS can be compared to the dynamism of Internet chats. “Text messages are difficult to capture: today’s message will not exist tomorrow” (*Ibid.,* p. 178). Due to SIM cards’ small memory, text messages function somehow like oral speech. In this sense, they differ from written culture and are closer to oral face-to-face speech, phone conversations, and

[37] The installation ~~**database**~~ presented in chapter 1 deals with the tensions between speaking and writing.

Internet chats. In order to have a record of what has been said, many teenagers copy the messages into notebooks,[38] which have the same function as an Internet chat's history archive. Text messages on mobile phones also are similar to chats because one message requires a response, and so on, creating a dialogue between the two (or more) parts.

- Location awareness/GPS (Global Positioning System)

Location awareness is also a simple and effective feature of some mobile phones. There are two different ways by which the cell phone can be aware of its position. One is accomplished by cellular positioning, which indicates the device location through the triangulation of radio waves detected by the cell phone. Another much more accurate way uses GPS systems embedded in the phone. Approximately 10 million GPS location-enabled handsets have been sold in the United States, Japan, and South Korea since October 2001.[39] The system, connected to a constellation of satellites, gives the device's position with a small error margin. A cell phone enabled with GPS or cellular positioning is necessary for the development of location-based services, such as information about the weather, restaurants, or facilities that are in the vicinity of the mobile phone user. Other possible uses are mobile yellow pages, find-a-friend, personal mapping services, and location-based games.

NTT DoCoMo (27 Mar. 2003) announced the first GPS mobile phone in Japan on March 2003. "The phone enables users to determine their location at the mere touch of a button, and download maps and information about the area. GPS accuracy is within 10-50 meters." By means of the new system, which is part of the I-mode standard, users can access information about public transportation and restaurants, as well as routing to help find specific locations. Furthermore, users can also find each other.

- Camera Phones

Another important feature acquired by cell phones is the ability to take pictures and create videos. Professor Ilpo Koskinen (2002) conducted research in Finland about the social effects of using camera phones among youngsters. In between other things, Koskinen (*Id.,* p. 21) points out the shift in the reason for taking pictures. Originally, a photograph replaced memory. One would take a picture in order to remember a place or a

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[38] There are special digital notebooks designed just to collect SMS.

[39] According to John Cunningham, divisional marketing communications manager at Qualcomm. Available at: http://www.qualcomm.com/press/pr/releases2003/press1183.html. Accessed on: 11 Oct. 2003.

person. Today, with digital mobile images, taking a picture is a means of commenting on the present and creating sociability. "In a digital world, an image can be responded with another image" (*Ibid.,* p. 33). He gives several examples in which cell phone users take pictures from their everyday life and send them to friends, with or without text. These pictures can sometimes come in a series, creating a visual narrative. Accordingly, friends generally answer with another image: a different one, or the same image manipulated (*Ibid.,* p. 32-65).

Formerly, cell phones have been claimed to introduce the feeling of "control" over one's life, enabling users to organize spatial and temporal relationships with people. I showed a couple of examples in which researchers emphasize micro- and macrocoordination among cell phone users, such as scheduling and coordinating meetings. However, Koskinen *(Ibid.,* p. 77) argues that "when e-mails begin to contain images, this feeling of control is secondary. The significance of mobile phone use lies rather in its potential for creating sociability."

Generally these images are not sent while working or doing "serious" things:

> The impetus to establish contact with others is often quite simply that one has a bit of time and is able to free oneself from the flow of busy routines. In this sense, sending mobile visual messages is similar to the recreational use of a mobile phone while, for instance, waiting for a bus or a train or being on the way and "nothing happening." (*Ibid.,* p. 78)

Naturally the ability to send and receive pictures is a characteristic of cell phones with Internet connection.

- Internet (WAP and I-mode)

Most devices in the western world access the Internet with WAP (Wireless Application Protocol). Using WAP, content can be delivered over the Internet to most current wireless networks, including the new networks with GPRS and 3G. Nevertheless, WAP has been skeptically seen by most mobile phone users, due to the fact that it is hard to use, does not have much content, and it is expensive. A study conducted in the UK in January 2000 recruited 12 users to test WAP usability. Among other tasks, users were asked to locate the address of the Imperial College in London using the business directory service on the Orange portal site. Ten out of the 12 users used the Internet regularly, 10 owned a mobile phone, three had shopped online before, and 11 were aged 30 or less. Despite their expertise, "only two were able to complete the task, and it took them over

25 minutes of searching to find what they looked for" (Helyar, In: Brown; Green Harper, *op. cit.,* p. 198). WAP technology in Europe was originally based on the GSM network, and users were charged according to the "air time" used. The large amount of time spent in order to find simple information generated a very expensive service. An alternative came with the GPRS network, which charges users according to the amount of data they downloaded. Even so, the cost is still expensive and the service did not become simpler.

In addition, the quality of graphics and information users can access via WAP is generally frustrating. Koskinen (*Ibid.,* p. 113) comments that "WAP was marketed as a 'mobile Internet,' which made users and business analysts expect a visual quality and service level compatible with that of the World Wide Web." However, WAP is a completely textual interface and could be more easily compared to SMS. The amount of content is also very low. Unless a Web site is written in WML (Website META Language), a WAP phone cannot access it. Therefore, the number of WAP sites is not so large compared to the number of I-mode sites in Japan. According to the Mobile Data Association (01 Sep. 2003), the main reason to use WAP sites is to download mobile games and ring tones.

Conversely, I-mode in Japan became so popular mainly for two reasons. First, the quality of the Web sites and graphics displayed on its screen makes it worthwhile to browse. Second, it is based on cHTML (compact HTML), which is very similar to HTML. Therefore, it is also easy for non-expert users to upload content and exchange information, just like in the WWW. Dealing with I-mode is much easier than WAP:

> Before accessing a site, WAP users must agree to pay extra charges and even type in URLs to browse through sites other than the service provider's portal. I-mode phones have a one-button browsing method, eliminating the need to type in web addresses. (Batista, 30 Aug. 2000)

The PC-based Internet had a similar development. At the beginning the Internet was merely textual. Although many multiuser environments still function in a textual interface, the introduction of images and graphics online revolutionized and popularized Internet use, mainly because it became much easier to surf the information space. With cell phones, we perceive the change from a small black-and-white screen, to larger color displays. In a not-so-distant future, it might be that even larger mobile screens are not enough to display huge amounts of information. Mobile developers are still careful to talk about the technology that will come after the third generation, or 4G. Björn Krylander, chief executive of UbiNetics, a UK-based telecom technology company, suggested in an interview to the *Financial Times* (Baxter *et al.,* 29 Oct. 2003) that some form of glasses or retina projection device might be the solution to display the outcome of a mobile Internet connection that will range from 100 megabytes (MB) to one gigabyte (GB) per second in 4G networks.[40] As a result, the visual component will acquire more importance in mobile networks and embedded technology.

However, this change tends to be slow. Krynlander (*Apud* Baxter *et al.,* 29 Oct. 2003) also points out that the more pervasive a technology is, the longer it will take to be replaced by a newer one, because people become used to it. Therefore, each mobile generation tends to have a longer life than its predecessor. “While 2G (GSM) has had a 10-12 year heyday, 3G will last 15-18 years, taking the arrival of 4G to 2019.”

In combination with imaging capabilities and Internet access, these features might in fact change the perception of what a mobile phone is. Moreover, as McLuhan predicted, it is not possible to transfer information between media without changing their meaning. Probably, the mobile Internet will carry other meanings than the actual WWW. However, one thing remains: the ability to create sociability.

[40] The faster modem connection today goes up to 56 kilobytes (KB) per second. 100 megabytes (MB) represents 100,000 kilobytes.

> "Personalization and customization are the most important elements in mobile phone interfacing, given that keitai are ultimately devices for the expression of individual identity. Mobile phones are nothing less than ID cards. Individual IDs/keitais react accurately to messages directed either at individuals or specific or non specific groups of individuals." (Suzuki, In: Raby *et al*., 2000)

7. CHANGING OUR PERCEPTION OF THE SELF: CELL PHONES AND PLACES

Big metropolises have always represented the nodes of the transportation and travel network. Since ancient times, urban centers such as Alexandria and Constantinople emerged as a function of crossing points of commercial and travel routes. They represented centers of the transportation network, like harbors and stations. Today, centers are no longer defined by their geographical location, but by the number of connections they support. Does digital technology influence the localization and organization of these centers? How can nomadic technologies redefine the way we view and understand cities? Anthony Townsend, an associate research scientist at New York University's Taub Urban Research Center, suggests that "the mobile phone might lead to a dramatic increase in the size of the city, not necessarily in a physical sense, but in terms of activity and productivity" (*Apud* Delio, 06 Sep. 2000). In this sense, no new physical infrastructure will emerge, but intensification of connections and decentralization a city can support.

Connectivity is likely to influence citizens' lives, transforming their perception space, as well as their self-perception. How do people perceive themselves in relation to technology and to other people when using nomadic technologies? Townsend suggests that frequently users become emotionally attached to their mobile phones. Moreover, "individuals now live in this phone space and they can never let it go, because it is their primary link to the temporally, spatially fragmented network of friends and colleagues they have constructed for themselves" *(Id.).* Would that be true? Do cell phones contribute to connect people to the physical space around them or to detach them from physical space, as Townsend suggests?

Although mobile phones might be ubiquitous technologies, their use is substantially different in distinct parts of the world. Therefore, studying cell phones "in general" would never be satisfactory to understand cultural aspects of the medium. People in different places have distinct perceptions of the interface and use the device in quite dissimilar ways. It is not possible to compare, for example, the use of the cell phone in the U.S., where for many the mobile is the third or fourth phone, and the second or third computer, with places in which fixed lines and the Internet are not as easily accessible, thus transforming the mobile phone to be their first phone, first computer, and first Internet connection. This is one of the reasons that make cell phones so unique in different parts of the world. Moreover, cell phones are mainly regarded as personal objects, and due to their proximity to the body, they are often also regarded as part of one's personality. These devices are full of cultural and social content, which can be extremely different depending on where the mobile phone is used. Thus there is no such a thing as "world mobile phone culture."

This chapter studies the relationship between cell phones, places, and its inhabitants. In a broader sense, it analyzes the relationship from people with technology in defining their personalities and their way of dealing with other people and the world. Cell phones are communication technologies, and many times they are considered intrusive, disturbing devices, promoters of personal isolation. Furthermore, many users develop emotional relationships with their devices. In a study conducted in Finland about children and teenagers behavior toward cell phones, Virpi Oksman and Pirjo Rautiainen (In: Katz, 2003, p. 198) found out that many users humanize the mobile, as if it were a virtual pet or friend. A 16-year-old girl told, "The antenna of my mobile broke, and I freaked out completely and didn't know if I could do anything with it. I kept thinking: 'Mobile, please forgive me!' The next day I just went out and got a new antenna."

Attributing human emotions to technology is not new, although it acquires different meanings with cell phones because, as we have seen in chapter 6, it is placed closer to the body, accompanying their owners wherever they go. Therefore, besides being private belongings, cell phones are also considered essential items for everyday life. Nevertheless, this perception differs quite a lot from place to place.

In this study, four places are compared. The first two, Japan and Finland, correspond to paradigmatic cities as far as the use of cell phones is concerned. Cell phones are widely used in these countries and they are thus part of the everyday culture.

Reflections of this close relationship can be perceived on they way people call the cell phone: *keitai* in Japan, and *känny* in Finland, meaning an extension of the hand, or what can be carried. Moreover, people use the devices no longer merely to talk, but also to send messages, to watch and to produce movies, to take and to send pictures, to access the Internet, and to buy products in vending machines. This usage diversity influences citizens' personal lives, changes their experience of urban spaces, and fosters the emergence of new imaginary spaces.

The other two places, the United States and Brazil, are case studies about the use of a technology that is not so pervasive as in the formerly mentioned places. Yet some social effects can already be perceived. How does Los Angeles, the city of cars and circulation, deal with mobile technology? How do people in Rio de Janeiro envision the use of cell phones? Do they think of mobile phones as just another type of telephone, or do they actually perceive the hybridization of space evidenced by the merging of borders between physical and digital spaces? Where are people most likely to use cell phones? Answers to these questions are partially supplied by an Internet survey developed between May and September 2003. The survey consisted in a form with two parts. The first one contained objective questions about the use of cell phones, as listed below:

1. Name
2. Age
3. Gender
4. City
5. Do you have a cell phone?
6. Which model?
7. How long have you had the phone?
8. You use your cell phone mostly to: speak, send e-mails, send SMS, search for content on the Internet, or something else?
9. In which context do you mostly use your cell phone: work or private?
10. Do you have your cell phone always on? Where do you turn it off?
11. Where do you mostly use your cell phone: in the car, on the streets, in restaurants or bars, in your home, in other people's home, at work, or other place?

12. Where would you not answer a call?
13. Why?
14. Why do you think cell phones are becoming so popular?

The second part of the survey consisted of qualitative questions to find out people's perception of the use of cell phones, also related to the use of the Internet and virtual spaces. The following questions were asked:

1. Do you think that nomadic technology devices (such as cell phones, PDAs, laptops) transform our experience of space and the perception of the real? How?
2. During the last decade, we used to say that cyberspace was an immaterial place, a space for the imaginary. Now nomadic technologies bring somehow this "virtual world" closer to physical reality. How do you think they can influence people's imagination and contribute to the merging of borders between physical and digital?
3. One of the characteristics of cyberspace was the user's feeling of immersion. Do you think nomadic technology devices also promote an "immersion" in physical space? Or a more abrupt detachment from physical space?
4. What will be the future of interface design?
5. Do you think that the use of cell phones help to enhance communication among people and create new communities, or does it increasingly isolate people from each other?
6. While inhabiting cyberspace, issues like the body representation (by means of avatars), presence and identity have been regarded as major study focus to those who created virtual environments. What type of problems and new perspectives can appear with the emergence of nomadic technology devices?

The research was conducted in two languages, Portuguese and English, and was answered by 126 people in a four-month period: 96 in Brazil, 25 in the United States, and 5 in Europe. Initially an e-mail was sent to a group of people in my mailing list. Then I asked the recipients to forward it to other people, taking advantage of the chain possibility allowed by the Internet. Because the research was conducted over the Internet, it focused specifically on people who are Internet users *and* who might or might not use mobile phones. Therefore, the sample group and the opinions shown below do not represent cell phone users "in general" in these two places. However, as this dissertation focuses on a passage from multiuser environments in virtual spaces to the use of physical spaces as multiuser environments, I believe that it is representative to investigate how actual Internet users envision the technology of the cell phone and how they see the connection between both mediums.

A random phone survey conducted in March 2000 by Ronald Rice and James Katz (In: Katz, *op. cit.,* p. 93) compared Internet and mobile phone usage in the United States. The authors affirmed that there's no knowledge about how Internet and mobile phone use are related. However, as long as the mobile phone will also contain the Internet, it might be that their usages and users coincide in the future. Among other things, Rice and Katz (*Ibid.,* p. 102) found out that Internet users do not necessarily own cell phones and vice versa. However,

> people who use both are somewhat more like those who use only mobile phones, and people who use neither are somewhat more like those who use only the Internet. The primary influence on this distinction is income, followed by education. Intriguingly, this particular digital divide occurs in opposite directions: higher income and lower education are associated with the mobile phone distinction, while lower income and higher education are associated with the Internet distinction. (…) Those who use both tend to those with the highest income and somewhat higher education.

In my survey, 99% of the users were both mobile and Internet users. Rice and Katz (*Ibid.,* p. 97) also emphasized that veteran Internet users[1] were younger, but the first mobile phone users were older. This result is probably connected to the fact that in the beginning cell phones were regarded as business devices, as a work tool. Yet their survey showed that newer consumers generally use the Internet for communicating with others, accessing information, having fun, and shopping.

I am aware that the number of people who responded to my survey might not be representative of the number of cell phone and/or Internet users in a country, or even in specific cities. However, my aim was to also get qualitative data about how normal users view the use of the mobile. The second part of the research includes roughly the same questions I asked artists and scholars while developing a set of 11 interviews. Most of all, this Internet research represents an early step in order to encourage the development of

[1] Veteran users represent users before 1998.

academic research related to mobile technology in Brazil. Nonetheless, most collected answers strongly match with already published statistics and articles about the same topics in Brazil and in the U.S., showing that there is somehow an average cell phone user.

The wish for the development of this survey emerged from the perception of the lack of academic research on mobile phone usage. As Anthony Townsend (In: Brown; Green; Harper, 2002, p. 62) argues, "the mass diffusion of inexpensive mobile communications technologies avoided scholarly attention, perhaps because it seemed pedestrian compared to the fantastic, nebulous depths of cyberspace." Indeed among scholars it is commonly accepted that research on telecommunications largely oversaw cell phones as communication technologies, while focusing mostly on the Internet during the past decade. Yet in the first decade of the 21st century the economic and social importance of mobile technologies is quite substantial, and worldwide ownership rates are rivaling that of TV set ownership (Rice; Katz, In: Katz, 2003, p. 91). Therefore, it is no longer possible to ignore social and economic effects of these nomadic communication devices.

However, while in the U.S. and Europe research about mobile phones is gaining visibility, there is a lack of research about this topic in Brazil. With roughly 174 million inhabitants,[2] and 40 million cell phone terminals,[3] Brazil could not be left behind in this analysis, since it is the country in Latin America with the largest number of mobile devices. Moreover, the fact that I got almost 100 responses from 11 different states in Brazil, contrasting with only 25 entries in the U.S., shows that (1) Brazilians are more likely to respond surveys and (2) users are interested in discussing the social consequences of mobile phones.[4] However, in Brazil mobile phones are viewed mostly as telephones, a fact that limits the study of cell phones as creators of imaginary places by means of games and art, producing multiuser environments in public spaces.

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[2] According to the IBGE census in 2002. Available at: http://www.ibge.gov. Accessed on: 01 Nov. 2003.
[3] Source: Teleco. Available at: http://www.teleco.com.br/comentario/com32.asp. Accessed on: 28 Jan. 2004.
[4] Simultaneously I received lots of e-mails from people who responded to the survey, who were interested in the work, and who wanted to know more about this topic, only from Brazil.

7.1. Finland and Japan: the mobile countries

Japan and Finland may be defined as paradigmatic countries regarding the use of cell phones. However, social impacts of mobile technologies in these places differ in some aspects. Much has already been studied about these cities and it is not the purpose of this chapter to make another extensive study. Rather, people's behavior and cell phone statistics in these countries are used as a comparison to the use of the mobile in America: United States and Brazil.

Both Japan and Finland have high penetration rates for the use of mobile phones. In Japan 62% of the population owns a cell phone, while in Finland this rate achieved 84.5% in 2002.[5] Finnish researcher Timo Kopomaa (*Apud* Puro, In: Katz;Aahkus, 2002, p. 28) states that "in the center of Helsinki, for example, it is almost exceptional *not* to see people using mobile phones." Although penetration rates in Finland and Japan might not be the highest in the world,[6] these two countries developed peculiar ways of dealing with cell phones, essentially transforming the relationship between human and technology. Both are unique examples of how cell phones change sociability, and how they create multiuser environments in hybrid spaces, including in the mobile communication distant users and nearby friends.

Common characteristics of the cell phone use in Finland and in Japan are (1) the wide use of SMS, related to social etiquette and sociability; (2) the use of the cell phone influencing self-perception, related to fashion and identity; (3) the development of location-based services; and (4) the use of cell phones as remote controls. Another common aspect of both countries, pointed out equally by Finnish Professor Erkki Huhtamo and Japanese Professor Machiko Kusahara, is that Finnish and Japanese citizens are not very much inclined to conduct face-to-face communication, thus a cell phone conversation would be "easier" than a live one.[7] This feature cannot be applied to Brazilians, and also Americans are more likely to engage in a face-to-face conversation.

[5] Source: ITU, 2002 (International Telecommunication Union). Available at: http://www.itu.int/ITU-D/ict/statistics/. Accessed on: 01 Nov. 2003.

[6] According to the same source, the places with the highest penetration rates in the world are: Iceland (90.28%), Taiwan (106.45% – which means that some people have more than one cell phone), Hong Kong (92.98%), and Israel (95.45%).

[7] Interviews to the author on Dec.15, 2002 and Jan.13, 2003. All other quotes from both professors in this chapter are from interviews to the author.

Furthermore, the use of text communication in Japan and Finland is high, a fact not mirrored both in Brazil and in the U.S.

7.1.1. Finland: *kännys* as text devices and sociability promoters

Professor Erkki Huhtamo mentions economic factors as one of the reasons for the early development of mobile phones in Finland. During the Cold War, although Finland was politically on the western side, much of its economic trade involved the old USSR. With the fall of the Iron Curtain in the late 1980s, the country was left in a bad situation, since competition increased and prices decreased. Thus, the country needed to look for new markets in the West and in Asia, as well as to get used to the idea of "radical competition." At this time, companies like Nokia, which produced mostly rubber until the early 1980s, were forced to develop new products. Nokia has been one of the pioneer companies to develop mobile phones in Europe, since the beginning of the 1990s.

From the user side, Huhtamo suggests that Finns have been surprised by the greatest economic crash in the history of the country. In a moment of uncertainty, having a cell phone represented security, since people could be in contact with each other. Adopting the GSM European standard allowed Finns to talk to any European country with their cell phones. Consequently it became easy to look for jobs or to study in other countries. Finally, he believes that the Finnish embraced cell phones so enthusiastically because of their shyness: Conducting a conversation on the mobile, or sending a text message was much easier than meeting people personally.

Reasercher Jukka-Peka Puro (In: Katz; Aahus, 2002, p. 26) argues that it might be possible that "the principles of Finnish speech culture will change as a result of the introduction of communication technology. If there is a change it may be in how silence is understood within Finnish culture itself." According to Puro, Finns worship silence, and they also believe that their communication abilities are poor. Being "always connected" changes the way Finns communicate and interact with other people. In addition, she notes that although most of the conversation via cell phones is very short, the number of daily contacts (especially for young people) is high, augmenting users' social network.

An interesting comparison comes from Goffman (*Ibid.,* p. 27), to whom the mobile phone might be "a new kind of stage where the mobile information society is acted Oct." In this sense, "a mobile phone is, in many respects, a place where one can go to chat about anything. (…) It is a stage that resembles a virtual cafeteria or marketplace where people meet each other" *(Id.).* Like multiuser environments in the Internet, cell phones also create virtual gathering places. Moreover, this social theater can also be envisioned like a game. Many people, especially in the United States and in Brazil, argue that cell phones do not create communities because the virtual mobile space in which the conversation happens is mostly shared by two people. However, mainly in Finland and in Japan, this "cell phone space" is no longer only a virtual space, and can be shared by many people, even those who have no phone in their hands.

In Finland, cell phones are not only "a teenager thing." In two-person households, for example, 91% of people under 30 own a mobile phone. Similarly, 97% of people between 30 and 49 years old are cell phone users, and 86% of the population between 50 and 64 years old owns a mobile, still a very high rate. The mobile ownership has also surpassed the number of PCs: While half the houses with people under 50 have PCs, this number decreases to 35% in the population above 50, in a two-person household (*Ibid.,* p. 20). Knowing that not having both technologies is *not* an economic problem, we can suggest that many Finns in fact decide to have cell phones as their personal computers. It is not difficult to predict that with the growth of 2,5G and 3G phones, Internet use will partially migrate to mobile phones. Another remarkable fact is that many younger households are beginning to "cut the cord" and prefer mobile phones to landline phones.

Most importantly, however, is the awareness that cell phones in Finland are no longer restricted to voice communication. For example it is common to use the mobile as a remote control. "Phone providers allow consumers to dial in a code for vending machines, charging cans of soda to their phone bills" (Cullen, 04 June 2001). Also, one can make instant payments at gas stations and ski slopes using the mobile. In this sense, cell phones are powerful interfaces, which can be permanently carried with the user and used for the most diverse purposes.

From all possible uses of cell phones in Finland none is more popular than sending SMS. The service began in this country in 1995, and in 1998 it was already the most common form of distance communication among teenagers (Kasesniemi; Rautiainen, In: Katz; Aahkus, *op. cit.,* p. 170-171). According to the Ministry of Transport and Communications in Finland, more than one billion text messages were sent in 2000 *(Id.).* SMS is not only used for exchanging messages among friends, but also to deliver services like news headlines, TV and movie listings, horoscopes, directory and address inquiries, the weather, or sports scores. Indeed, Erkki Huhtamo notes that people send more SMS than e-mails in Finland, demonstrating that mobile communication exceeds fixed Internet use. Huhtamo also argues that mobile Internet in Sweden developed earlier than in Finland: As a consequence, Finnish people started to use SMS instead of mobile e-mails.

New vocabulary derived from the practice of sending text messages evidences the ubiquitousness of the SMS culture. Finnish teenagers do not speak about sending text messages; rather, they use words like *tekstata* or *viestailla*, verbs derived from the nouns "text" and "message" *(Ibid.,* p. 177). In the U.S., something similar happens. Young people talk about "texting" or "SMSing" instead of "sending text messages."

Kasesniemi and Rautiainen *(Ibid.,* p. 181) also stress the collective reading and composing of messages as a way of creating sociability and communities among teenagers. "Text messaging goes against this image of mobile communication as an individualistic communication channel. This is due, in part, to the way teens read messages to each other." Reading messages in public places like bars and cafés creates new friends and maintains old relationships. Messages are written in a group, mainly among girls. In this case, friends generally have the role of consultants. The consultant enhances the quality of the message, helping to transmit the maximum of information in 160 characters. Besides the collective reading and composing of messages, text culture in Finland also includes message collection and the circulation of chain messages. Mobile chain messages are similar to old letter chains and today's e-mail chains: One sends a message to many, telling that something good is going to happen if the message is forwarded to a certain number of people. Conversely, something bad is likely to happen if the chain is broken. Unlike old letter chains and today's e-mail chains, the chains of tomorrow are going to be mobile.

Because the text messages are sent via the mobile phone, the system is much more agile and sociable, since writing letters and e-mails is traditionally a solitary act. Furthermore, when the traditional communication among a group of friends includes a mobile phone, it also embraces somebody who is not physically present, but is brought into the nearby context by means of her voice and/or text, in real-time. This mixed communication that encompasses groups in contiguous and non-contiguous spaces creates a hybrid space, defined by communication, mobility, and the merging of borders between physical and virtual.

Another important factor regarding mobile technology in Finland, which is developing toward what has already been happening in Japan, is the use of camera phones. As mentioned in chapter 6, the fact that Professor Ilpo Koskinen (2002) dedicated a book to social effects of the use of mobile images demonstrates the importance of this novelty. However, as the use of mobile Internet is not so common in Finland, Koskinen (*Id.,* p. 102) notes that although the researched group was provided with GPRS connection on their mobiles, most images taken with the camera phones have been visualized in PCs. This is not the case in Japan.

7.1.2. Japan: *keitai* are part of Japanese life

In Japan, observes Professor Huhtamo, the most common way to connect to the Internet in Japan is via the cell phone. Machiko Kusahara told that she once complained with her students because they would not read the e-mails she sent to the class to the end. They thus responded that they were too big for the cell phone screen. One could thus think: why don’t they just use a PC? However, most young Japanese people no longer use (or have never used) PCs to access the Internet.

As Howard Rheingold (2002, p.xi) already noticed, Japan developed one of the most interesting cultures around the cell phone. The fact that most people in Tokyo were *staring* at their cell phones instead of talking to them showed that a new relationship to the technology had been created. Partially because of NTT DoCoMo investments on mobile technology, from which the I-mode standard is one of the outcomes, and partially because Japanese culture fitted well with portable and small technology, the truth is that cell phones are part of Japanese life.

NTT DoCoMo launched commercial cellular service in 1979.[8] The I-mode standard, introduced in 1999, is the company's mobile Internet access system. Although it is still most used in Japan, the I-mode already exists in Taiwan, Germany, Holland, Belgium, France, and Spain. The system can work both with 2G and 3G phones. However, even in the 2G systems, the I-mode is "always on," provided that the user is inside an area which the I-mode signal can reach. In contrast to circuit-switched WAP phones that require dial-up connection, the I-mode is packet-switched, not needing to establish a connection each time one needs to access the Net.

With I-mode,

> users send e-mail, look at the weather forecast, look at sports result, load ringing melodies into their handsets, play games, do online banking, online stock trading, purchase air tickets and train tickets, download cartoons and images, look for restaurants and look for new friends. (Eurotechnology Japan, 2002)[9]

As has been noted in chapter 6, the I-mode is based on cHTML, a very easy language similar to HTML. Users find it easy to produce and upload content to the I-mode network. cHTML has a few tags that are different from HTML, like a link tag that dials up to a telephone number when pressed, and an I-mode-only tag, which informs search engines that a particular Web page is an I-mode page. One can also look at I-mode Web pages with an ordinary Netscape or Internet Explorer browser.[10] Some possible reasons why the I-mode is so successful in Japan are: (1) it is easy to create content for it; (2) PCs in Japanese homes are not as widespread as in the U.S. and in Europe; (3) low

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[8] According to the ATIP report. (1998) Available at: http://www.cs.arizona.edu/japan/www/atip/public/atip.reports.98/atip98.081.html. Accessed on: 14 Jan. 2003.

[9] Available at: http://www.eurotechnology.com/imode/faq-gen.html. Accessed on: 18 Oct. 2003.

[10] Some examples are available at http://www.eurotechnology.com/i/ and http://www.eu-japan.com/i/. Access: 01 Nov. 2003. However: "(a) at the moment almost all I-mode users are Japanese and therefore almost all I-mode content is in Japanese language. Therefore you will need a Japanese enabled browser, (b) you will not be able to see imode-only tags (such as the links which dial a telephone connection directly from the I-mode handset in Japan), (c) and you will not be able to see the many special DoCoMo I-mode symbols. They will usually be replaced by a question mark. So looking at an I-mode page with an ordinary PC based browser will give you an idea, but will not exactly reproduce what I-mode users see on their handsets." (Eurotechnology Japan, 2002)

cost; (4) high cell phone penetration rate—60 million mobile subscribers in 2002;[11] (5) "always on" connection; and (6) fashion and efficient marketing (Eurotechnology, 2003). As a result, users of mobile Internet in Japan are substantially greater than in other parts of the world. Still according to Eurotechnology, in 2000 81% of the world's wireless Internet users were in Japan, 12.5% were in Korea, 5% in Europe, and only 1% in the U.S.

3G phones in Japan, like FOMA (NTT DoCoMo's 3G mobile service), are able to take still pictures, produce videos, and take stereoscopic pictures. Moreover, they have larger and high-resolution color screens, more durable batteries, and come with software with image- and text-processing capabilities.[12] It is increasingly more obvious that cell phones in Japan are not only about voice, but also about text and images.

The I-mode standard in Japan represents one-step further current WAP browsers available in other parts of the world.[13] Similar to the origins of the fixed Internet, the WAP browser currently contains no graphics or images. We shouldn't forget, however, that similar to the first PCs, earlier cell phone screens were monochromatic. Furthermore, we should remember that in the beginning of the 1990s most Internet resources were text based and today the WWW includes all sorts of graphics, videos, and 3D content. Are WAP browsers developing in the same direction? Are we moving toward a visual mobile culture? Artist and professor Bill Seaman[14] believes future mobile devices will not only have larger colorful screens, but they will also be able to project their screen content into the environment, embedding digital content in physical space. Though this future might be a little further, graphics and videos are already part of the Japanese mobile culture.

Because most Japanese teenagers access Internet technologies through their cell phones before they do so on a personal computer, "they aren't inclined to make the disappointing comparison between the capabilities of the wired Web and mobile Internet

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[11] Source: ITU, 2002 (International Telecommunication Union) <http://www.itu.int/ITU-D/ict/statistics/> Accessed on: 10 Jan. 2004.
[12] Currently "there are three parallel 3G networks in operation in Japan: NTT DoCoMo and J-Phone / Vodafone operate 3G networks based on the wCDMA standard, while KDDI / AU operates a network based on CDMA 2000-1x technology. Functionality of these networks is very similar. Japan is the world's first country to introduce 3G." (Eurotechnology, 2003). Available at: http://www.eurotechnology.com/imode/faq-3g.html. Accessed on: 01 Nov. 2003.
[13] However, the Japanese cell phone marketing is closed. Japanese cell phones only work inside Japan.
[14] Interview to the author. (05 Feb. 2003)

service," suggests Dmitri Ragano (05 Mar. 2002). Moreover operators in Japan have avoided promoting the new services as *the Internet*, but instead offer them as features that are part of any *keitai*. Therefore, the common comparison between WAP and WWW is nonexistent in Japan regarding the I-mode.

How is this new mobile Internet going to develop? How is it is going to change our perception of what the Internet is? The way people refer to the mobile Internet is already different from the fixed Web. The immersive feeling developed by the use of spatial metaphors is no longer there. One used to be *in* the Internet, to go to a Web site, or to inhabit a virtual world. When mentioning the mobile Internet, most users, experts, and researchers focus on what one can *do* with it, rather than on immersion. Rheingold (2002, p.xvi) suggests, "mobile Internet, when it really arrives, will not be just a way to do old things while moving. It will be a way to do things that couldn't be done before." Furthermore, many reports about mobile Internet, such as the one produced by the marketing company A.T. Kearney (2003), focus on services that can be accessed via the mobile telephone in order to facilitate people's lives *in physical space*. We are moving away from the utopia of creating virtual worlds in cyberspace. The mobile Internet is considered as an auxiliary of everyday life, offering services and entertainment.

Many tips about the future of the mobile Internet are already showing up, like location-based services and games, which many consider to be the "killer app" for mobile technology. The A.T. Kearney report[15] (2003, p. 8) affirms that entertainment services are already considered killer applications in Japan, because "the adoption of entertainment services is widely credited with driving the adoption of other services." However, even being able to offer many services available in the WWW, the mobile Internet will differ from the current fixed "cyberspace" by the simple fact that users can use it while moving through physical space. It is thus less likely that users focus on things such as *the opposition between the virtual and the physical*, and *the perception of the Internet as an immersive place*. The mobile Internet is embedded in physical space. Providing a mobile connection to young people who had no previous contact with the

[15] The A.T. Kearney report, although being an interesting study about the future uses of mobile Internet, also cannot be considered representative of cell phone usage, mainly in Brazil. Only 309 people have been interviewed and this number is not representative of 40 million. However, while the percentages might not be accurate, the proposed directions are important.

fixed Internet is perhaps the key to find out how it will evolve. Ragano (05 Mar. 2002) suggests that many Internet companies—not just in Japan—have studied children to understand the potential for new applications.[16]

Howard Rheingold (2002, p. 6) tells that by spring 2001, teenagers in Tokyo had two main characteristics: “most were not already Internet users through desktop PCs, and most viewed *keitai* as fashion as well as technology.” Japanese people, especially teenagers, embraced cell phones as personal items, transforming them into components of their personalities, and important elements for group and interpersonal communication. Mobiles are not only communication tools, but also fashion items. Like fashion items, they should be displayed and personalized, becoming part of one’s social presentation. In Japan (more than anywhere else in the world) phones are sold in different styles and designs, they have different colors in order to match the kimono and other types of clothes.

Earlier I-mode models, tells Dmitri Ragano (05 Mar. 2000), have been designed to fit in the businessman’s shirt pocket. They were thin, long, and had small screens. Moreover, mobiles were mostly gray and black, since they were supposed to be neutral communication tools. Later when new manufactures entered the marketing they were supposed to sell something different, and fold-up handsets were created. Surprisingly, these fold-up models quickly attracted young girls, since they would easily fit into handbags. Furthermore, larger screens made writing e-mails easier. What happened afterward was a shift in the cell phone target consumer: from businessmen to teenagers (girls and boys), and later to a more varied public. Today fold-up handsets are the top-selling cell phone models.

Machiko Kusahara tells that Japanese people recover old cultural habits by means of the cell phone. For example, the netsuke, an old ornament used as a counter-weight hanging on the kimono, was replaced by the cell phone. As kimonos do not have pockets,

[16] It is worthwhile to mention that Microsoft is investing in mobile technology, extending the personal computer. The company just announced the release of a mobile device with the Windows operating system in the first quarter of 2004. “The phone, dubbed Voq, is slightly larger than most Web-enabled phones on the market. But it comes with a full-color screen, a fold-up QWERTY keyboard, an MP3 player, an Internet Explorer browser and support for multimedia messaging and e-mail.” (Batista, 13 Oct. 2003) Even looking like a normal mobile phone, the Motorola MPx200 from AT&T Wireless, is the first cell phone in North America equipped with Windows Mobile software with the ability to access e-mails, calendar, and tasks with Microsoft Outlook.

people used to carry belongings in the netsuke, which had a small container. Today's *keitais* have "straps" to hang on the kimono belt like the netsuke.

Pictures 30 and 31: the old Japanese Netsuke and today's cell phone straps.

There are several different types of cell phone straps. Sometimes they ring and change color every time one receives a call. Straps can also be considered socializing objects and a means to connect to people. For example, there are straps for the couple. They come in a set of two, generally two metal hearts, two stuffed dogs, or two little stuffed bears. When put together, they produce noises and change color. Below are just some examples of straps for two lovers.

Picture 32: cell phone straps for two.

Following this tendency to socialize, interpersonal awareness devices are common in Japan. The **Lovegety**, for example, originally released in 1998, allows the user to input data about herself, such as personal preferences and hobbies. While walking on the streets, if another **Lovegety** is close by, the device beeps. If another **Lovegety** with similar preferences is close by, it beeps differently and changes color. Likewise, the **ImaHima**, a location-specific application for the I-mode standard and WAP technology, makes the principle of newsgroups mobile, displaying on the mobile screen nearby friends and people with same interests. Like a mobile ICQ,[17] each person must agree to have her location tracked by **ImaHima**. There is also the possibility to contact a stranger whose profile matches the user's request if she allows herself to be contacted by an unknown person. However, whereas ICQ shows on the computer screen users simultaneously connected, independent of physical location, **ImaHima** connects people within a close radius in physical space.[18]

The popularity of these gadgets, devices, and applications in Japan evidences that cell phones are not only used to communicate with people who are distant, but also to socialize with peers who are nearby, sharing the same physical space, even if they are not at eye-contact distance. Finding people to socialize in cyberspace has always been critical in multiuser environments in the fixed Internet. Mobile Internet users also look for people with whom to socialize. *The difference, however, is that mobile networks help to find people in public spaces.*

Professor Machiko Kusahara suggests that the *keitai* is so popular in Japan because of the Japanese lifestyle: They live in a limited space, spending a long time using and waiting for public transportation. Therefore, a small device, which can fullfil the "in-between" space becomes the ideal communication tool. Kusahara also implies that users feel that the mobile phone is part of their identity because they can carry it around and personalize it. Thus the Internet also becomes wearable and people feel like they are connected to others anywhere, wherever they go. Rather than connecting virtual spaces,

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[17] Available at: http://www.icq.com. Accessed on: 17 Dec. 2003.
[18] ImaHima won the Prix Ars Electronica in the category Net Vision / Net Excellence in 2001.

like the traditional Internet, mobile phones connect physical spaces. Moreover, they do not only connect spaces; they transform people in the nodes of the network.

Despite their popularity, cell phone etiquette requires that the mobile should be hidden while not in use. Sadie Plant (2001, p. 44) notes that in Tokyo fashion designers have responded to this need by making bags, jackets, and loose combat-style trousers with pockets designed to keep the *keitai* close at hand.

Picture 33: cell phone case in Japan.

Plant (*Ibid.,* p. 51) also notes that the ubiquitous use of cell phones change people's behavior.

> People have introduced new stances, gestures an bodily movements to their everyday behavior, changing the ways in which the body, the fingers, the thumbs, the hands and the eye are used while making and taking mobile calls or sending and receiving mobile messages.

An example is the Tokyo "thumb-tribes." A young girl in Tokyo observes that *keitai kids* not only use their thumbs to manipulate their mobile phones. They also start to point at things and ring doorbells with their thumbs (*Ibid.,* p. 53). The picture below is a public advertisement for a thumb-competition in Japan. The winner would be the fastest one to type an e-mail with their thumbs on a mobile phone.

Picture 34: Thumb-competition advertisement.

Like in Finland, camera phones also changed the way Japanese people used cell phones, creating a new type of mobile visual social communication. Almost 70% of cell phones in Japan come with a camera. Initially released by J-Phone, NTT DoCoMo's competitor in 2000, now they are the most sold models in both companies. Today's camera phones make high-resolution images that can be automatically sent to any person who has an Internet connection and e-mail. As previously mentioned, these pictures work like a comment or a narrative on daily activities, rather than actually remembering something. For example,

> one 20-year-old college student snaps several pictures a day with her camera phone: a picture of her new haircut to send to a boyfriend; a really large shell that she found on a beach; her pet in a cute pose; or a photo of an interesting view from an escalator at a station that she frequents. These are photos of everyday moments and events that are newsworthy only to an individual and her intimates. (Daisuke; Ito, 29 Aug. 2003)

A recent survey conducted in December 2002 showed that 42.4% of camera phone users take photos of everyday things. The next most photographed topic is the family (39.5%), then friends (26.4%), pets (23.7%), and finally travels (21.5%) *(Id.)*. The fact that travel is the least photographed subject is representative of a mobile culture, in which immediacy counts more than memories.

Probably digital cameras embedded on mobile phones will also create a new kind of photographic imaginary. As Koskinen (2002, p. 62) mentioned, these pictures tend to renarrate daily life in a playful way. I showed that previously imaginary spaces have been created by the narration of distant and unknown spaces, brought by travelers' tales. Similarly, the habit of traveling somewhere as a tourist, documenting it by means of pictures, has been a way of remembering the place, as well as telling others about one's experience in a distant place. Therefore, travel pictures nourish others people's imagination, who could wonder how it would be if she had been there. Mobile pictures, on the other hand, narrate everyday life. Certainly they can also narrate travels, but their major use is related to daily subjects.

The appearance of digital cameras already represented a change in the role of photographs. With no need to develop a film, and no waiting time to see the pictures, people were much more comfortable in taking a huge number of pictures, aware that they could "just delete" or download to a computer afterwards, in case the memory was full. As a result, pictures no longer documented only "special occasions," like travels, birthdays or parties, but also showed everyday situations. The mobile camera-phone inherits this characteristic of digital cameras. The major innovation though, is the ability to immediately e-mail the just taken pictures. Camera phones are socializing devices because users start *sharing* their daily experiences with friends and relatives. A picture thus starts having the same value of e-mail: to narrate the daily life, or to communicate immediate topics.

As a result, we can suggest that imaginary places are coming from the distant and "unknown" to the present context. Therefore, the term *imaginary* does not mean something unreal; rather, it describes potential developments and outcomes of the real, which can sometimes be unknown. Imaginary becomes the virtual itself, always willing to become reality and to pop up into the physical world. The unheard part of cell phone conversations, and the re-creation of everyday reality by means of mobile pictures and games match this criterion. This collective imagination becomes more powerful when many can use the technology that helps to produce and mediate it.

In Japan and in Finland it is rare to see one *not* using a mobile phone on the streets. The widespread use of mobile technologies signaled to NTT DoCoMo the necessity to look into a broader aspect of mobility, which includes ubiquity. The **Wristomo**, the mobile phone wristwatch mentioned in the last chapter, is one of the company's ubiquitous products. Additionally, they are working on **M-zone** (a public wireless LAN service), **@FreeD** (a card offering continual Internet connection for portable terminals), Telematics (in-car information services), and **C-mode** (a system to operate vending machines from mobile phones). This last service, similar to the one already existing in Finland, will allow cell phone users to download a unique barcode, which is displayed on the mobile screen and can be read by a sensor in the vending machine to buy, for example, a Coke. NTT DoCoMo is currently conducting research on 4G (fourth generation) mobile communication.[19]

7.2. United States and Brazil: cell phones are just cell phones

7.2.1. U.S.: Why is it so far behind? Historical facts.

While Japan and Finland embraced new uses and explorations for the mobile interface, America (U.S. and Brazil) still views the cell phone as just a mobile (or cellular) phone. Everybody wonders why cell phones are not as integrated in American society as it is in Asia and in Europe. Although almost half of the North American population owns a cell phone (48.81%)[20] mobiles have not substantially changed the American lifestyle. A certain transformation in the perception of space and time is indeed recognized, but this transformation is mainly related to voice contact and not to Internet connection or text messaging, as has happened in Japan and in Finland. This might be one of the reasons why most interviewees that responded to the survey agreed that mobile devices do change the perception of space, but not the perception of the real. Accepting transformations in the scope of the real includes a new manner of dealing with reality, of viewing imaginary spaces, and of creating new spaces for sociability and communication. A 27-year-old L.A. citizen said:

> I don't think that they (cell phones) have altered our perception of what is 'real.' They have been accepted in the way that telephones or pagers were at their introduction, as a necessary tool for communication. I do think that they have changed our perception of space, particularly of

[19] For more information about NTT DoCoMo's vision of the future, see: http://www.nttdocomo.com/corebiz/ubiquity/. Accessed on: 16 Jan. 2004.
[20] Source: ITU, 2002. (International Telecommunication Union). Available at: http://www.itu.int/ITU-D/ict/statistics/. Accessed on: 28 Jan. 2004.

> geography. We have changed the way that we organize meetings and travel and the idea of being 'lost' in a city is far less daunting when one is armed with a cell phone.[21]

Likewise, most users (also in Brazil) agreed that cell phones enhance communication, but they do not create communities. This fact is also understandable, as far as cell phones in the U.S. and Brazil are mostly used for two-way communication. "I think it enhances person-to-person contact but not necessarily develops communities. I see 'communities' as a collection of people. The cell phone is inherently individualized."

Likewise, Linnda Caporael and Bo Xie (In: KATZ, 2003, p. 227) report that in phone research conducted in the United States they were "disappointed to find few reports of changes in interpersonal relationships." Trying to explain this fact, they suggest that questionnaires are not the best way to detect these types of changes, because people are not likely to accurately notice or report such experiences. Therefore, a more detailed and informative research method would be necessary. I partially agree with them, but I also consider cell phones in America to be definitely used as phones and thus they do not promote substantial differences in people's relationships.

The use of cell phones in the U.S. differs substantially from other places outside America, like Western Europe and East Asia. Reasons for this fact include:

(1) The cell phone technology: While all of Europe has GSM phones, in America there were diverse systems such as TDMA,[22] CDMA,[23] and analog AMPS,[24] which hardly communicated to each other. Only recently GSM has become the major technology in America. An article from the online magazine **Cellular-news** (09 Oct. 2003) attests that between June 2002 and June 2003 GSM outpaced other wireless technologies in the USA and Canada. This fact can also be applied for other countries in

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[21] From now on, all quotes without reference are taken from the Internet survey explained in the beginning of the chapter.

[22] *Time Division Multiple Access.* "Digital transmission method in which many users can share the same channel, splitting time slots. Second generation cellular systems, like IS 54, IS 136 and GSM, employ TDMA as an interface with the mobile station." Source: Teleco. Available at: http://www.teleco.com.br/glossario.asp?termo=TDMA&Submit=OK. Accessed on: 18 Jan. 2004.

[23] *Code Division Multiple Access.* "Digital transmission method based on spread spectrum. It is utilized on second and third generation systems, such as IS-95. With CDMA, each call receives a code that is used by the mobile station to identify which signals in the spectrum belongs to them." Source: Teleco. Available at: http://www.teleco.com.br/glossario.asp?termo=CDMA&Submit=OK. Accessed on: 18 Jan. 2004.

[24] *Advanced Mobile Phone Service.* "Analogic cellular system for the frequency 800 MHz adopted in the United States and Brazil. It was the term used by the Bell Labs at AT&T in the past to designate the cellular technology they developed." Source: Teleco. Available at: http://www.teleco.com.br/glossario.asp?termo=AMPS&Submit=OK. Accessed on: 18 Jan. 2004.

Latin America, in which now GSM technology represents the majority (43%) of the cell phones. Because Brazil followed the U.S. standard—and not the European—usage and development of cell phones in both countries is similar.

(2) Until 2002 it was not possible to send SMS across different providers. As a result, if one had a contract with AT&T Wireless, she could not send a message to the owner of a T-Mobile phone. Furthermore, text messages are still expensive. The basic AT&T plan, for instance, charges 10¢ for each sent SMS.

(3) Very cheap and available landlines. Almost everyone has a landline with low installation costs and no cost for local calls. Consequently, cell phones are generally not the only owned phone. Moreover, cell phones are expensive and have limited minutes one can talk a month—depending on how much one pays. "Most North Americans turn their cell phones on when they are out of the house and office, when they cannot be reached on a landline. This keeps their wireless minutes down and service providers don't make a lot on casual users of cell phones" (GeckoBeach, Sep. 2002). In places where fixed phones are not available to large parts of the population, cell phones grow much quicker. Japan is one example, and Brazil, another.

(4) The U.S. did not adopt the method CPP (calling part pays). Therefore, one has to pay for the calls one makes and receives, turning cell phones into very expensive devices. Brazil and other countries like Israel, a long time ago changed this system, having the owner of the cell phone pay only for the calls she makes. In the U.S., one pays for a specific amount of wireless minutes. If the user exceeds these minutes, the cost per minute of conversation becomes much higher. For example, in a basic AT&T plan one pays $29.99 U.S. a month to speak 250 minutes (an average of 12¢ a minute). Each additional minute costs 45¢.

(5) The cost per minute is still high. In order to minimize this fact, some companies offer unlimited minutes during nights and weekends, as well as no extra charge for long-distance calls. This is the only way wireless communication can compete with fixed landlines, because long-distance calls made from a fixed phone in the U.S. are not free of charge.

(6) Finally, the economic and political history of cell phones shows why there is a delay in having mobile phones as part of people's lives. According to Eric Abrahamson

(2003, p. 33), "competition in the regulatory arena and the slow pace of institutional change at the FCC (Federal Communications Commission) and AT&T, particularly, had cost the U.S. its lead in cellular development."

The history of cell phones is a byproduct of the development of wireless and mobile communications. As Barry Brown (In: Brown; Green; Harper, 2002, p. 7) notes, the development of cell phones in America is a history of non-development. The technology to produce mobile phones was up and running since the 1940s. However, there were practically no investments and efforts to develop and implement this technology, mainly because investors and governments could not foresee a profitable use for the cell phone.

Likewise, personal computers had a hard time in the early/mid-1970s. At this time the technology to produce smaller personal computers was already available, but nobody could predict for what PCs could be used. Steven Johnson (1997, p. 48) tells that in the mid-1970s an Intel engineer scheduled a meeting to present a project that involved developing a personal computer. He envisioned a future in which PCs would be as common as TVs, stereo systems and vacuum cleaners. The cost at that time would be no more than ten thousand dollars. Despite his exciting presentation, he could not answer the most basic question: What would people actually *do* with personal computers? Of all possible uses, he could predict no more than storing digital recipes. To Johnson, it was like inventing the wheel and showing what a wonderful doorstop it would make.

After the Second World War, investments were directed to projects on artificial intelligence, computer graphics, and nuclear weapons, but not to mobile and wireless technology. Brown (*op. cit.,* p. 7) notes "the early history of the mobile phone gives an example of how a technology can be delayed by decisions to favor other technologies." Eric Abrahamson (2003, p. 8) argues that since the development of the wireless telegraph in 1899, the wireless telephone could be technologically developed. However, the inventors of the telegraph failed to see the potential to transmit voice. Until the 1920s, missed opportunities and a lack of institutional support characterize the development of wireless communication. In the 1930s, Motorola started selling car radios, which are the direct predecessors of mobile phones. However, since the 1920s, the success of broadcast radio communication overshadowed possibilities of development of wireless (two-way) telephony. Still according to Abrahamson (*Ibid.,* p. 9), "regulatory decisions that focused on enabling the growth of the broadcasting industry made it increasingly difficult for innovators to experiment with wireless telephony." Consequently, innovations in two-way radio communication have been pushed by individuals and institutions to the edges of the communications industry. These innovations were driven by the diffusion of another new technology: the automobile.

In the 1930s car radios used frequency modulation (FM) technology, and were almost exclusively used by the police. The outbreak of the Second World War, however, put further development of the radio spectrum on hold. During the war, Motorola continued to innovate, creating devices for what was later called "the first mobile war." The company developed radio systems for jeeps and ground troops, as well as the first backpack radio, known as a Walkie-Talkie.

Despite the initial usage of the FM spectrum to two-way radio communication, after the War, electronic industry associations and the State Department in the U.S. started pressuring the FCC to prioritize radio spectrum allocation for a host of new (broadcasting) technologies including television and FM radio (*Ibid*., p. 10). Government regulations and the failure to provide radio spectrums to mobile telephony prevented the cell phone to develop as fast as in other countries. According to Abrahamson (2003, p. 5), there were four important organizations involved with the (non)development of cell phones in the U.S. The first was AT&T, the biggest telephone company in the United States, which had in the 1970s a solid wireline infrastructure, with an enormous network of cables, switches, and microwave relay stations, and therefore was not interested in developing wireless communication. The second company was the Bell Systems, which produced the finest landline telephone system in the world, and moved hesitatingly and at times with disinterest toward wireless. Third, the FCC, which since 1934 managed public airwaves on behalf of the federal government, constituted the most significant factor hindering radio-telephone development, especially cellular radio, delaying that technology in America by perhaps 10 years. The last company is Motorola, which pioneered wireless radio development since the 1930s.

Although most of the available radio spectrum was given to broadcast technologies, at the end of the 1940s the aviation industry declared that two-way radio communications were vital to the growth of aviation services. Still concerned with security due to the wartime paradigm, the FCC finally allocated blocks of spectrum to mobile radio service. However,

> studies showed that the length of a mobile telephone call would be three times as long as a private radio call. (…) Spectrum was too precious to waste on idle conversation that would be affordable only to the affluent. If someone really needed to chat, the Commission concluded, they could wait to find a telephone. (Abrahamson, *op. cit.* p. 14)

In addition to this fact, around 1950 television receivers were extremely susceptible to interference. Consequently, the FCC blocked the allocation of nearby frequencies to avoid interference, shrinking even more the spectrum left for mobile radio. As a result, communication research in this area was also minimized. It was only in 1964 that the FCC realized that mobile services were needed for the economy and decided, in 1968, to allocate some non-used UHF (television) spectrum to the public mobile radio system.

However, using radio spectrum to develop mobile telephony represented still a problem, because the number of people that could simultaneously use the frequency was very reduced. Like a fixed telephone call, two users would allocate a specific spectrum for the duration of the conversation and, as telephone conversations are generally longer than radio conversations, the system would be restricted to a few users. As Abrahamson *(Ibid*. p. 27) remarks, in the late 1960s the public mobile-radio system in New York could support only 543 users. The solution to this problem arrived with the invention of the cellular system. First proposed by Bell Labs scientist D.H. Ring in 1947, the term *cellular* means dividing a geographical area into hexagonal cells covered by a transmission antenna to augment the capacity of the system by reusing radio spectrums. Customers in a given zone would send and receive to a single transmitter or base station using a particular frequency. Transmitters in adjacent zones would use different frequencies to avoid interfering with one another. The next problem, then, would be how to carry calls from one cell to another. This problem was solved by the creation of the roaming system, which designates a mobile unity which enters a cellular system that is not the one to which it is subscriber. A user is in roaming “when she moves outside her mobility area, but inside her operator's coverage area"[25] (Souza; Tude, 2002 p. 3). Of course depending on the plan, the customer can have access to an assemblage of base stations, which covers a city, a state, or the whole nation.

After the allocation of a larger spectrum for radio communication and the implementation of cellular technology, AT&T and Motorola started to research and develop prototypes for cellular telephones in 1973. By then, 37 years had passed since the first Motorola car phone service. Barry Brown (In: Brown; Green; Harper, 2002, p. 8) suggests that it is tempting to blame the U.S. federal government for the delay in the implementation of the cell phone system. However he notes that in other countries the development was just slightly quicker. "A more fundamental delay (…) came from the hesitancy of researchers to do cellular telephones research" (*Ibid.,* p. 9). During the 1960s and 1970s videophones attracted much more academic attention than mobile phones.

As a result, nobody could foresee the explosive growth of the cell phone market beginning in the 1990s. In the early 1980s, AT&T predicted that the total number worldwide would be around 900,000 at the turn of the century taking into account the poor quality of the devices and the substantial cost of mobile phone calls at that time *(Ibid.,* p. 1). Today there are more than 1 billion cell phone subscribers worldwide.

There are other specific facts in Los Angeles that impede to the unrestricted use of cell phones. While in Tokyo the use of cell phones is a very common "in-between" activity, such as when people are waiting for the train or buses, in Los Angeles there is almost no public transportation, so people are not used to waiting. They drive their cars to go from place to place. Not surprisingly, as much as 44% of the interviewees in L.A. said they use their cell phones mostly inside their cars. Moreover, there are not many places where people walk on the streets, making the public use of mobile phones very restricted. Furthermore, there is also no law that prohibits the use of cell phones while driving.

Interfacewise, handsfree devices are increasingly more popular. In cars they are almost necessities. Even on the streets it seems that users prefer not having to hold the cell phone with their hands. They place their cell phones in their pockets and for outside observers it seems that they walk on the streets talking loudly to themselves.

[25] "quando se move para for a de sua área de mobilidade, mas dentro da área de cobertura de sua operadora."

> Cell phones just make people look schizophrenic because you see all these people walking vigorously across campus really involved in a conversation with themselves… or at least that's what you think until you see that there's this wire sticking out of their ear. I mean, what's so damn important that you've got to make the most of your twenty-minute stroll to class by having a heart-to-heart with someone?

Among the users who responded to the U.S. survey, mobility was seen as a decisive characteristic of nomadic technologies. Although it has been generally pointed out that mobility is the "only" difference from fixed phones (because phones in the U.S. and Brazil are mostly used for speaking), users do recognize that cell phones changed substantially the way people communicate and access each other. "First, it was really convenient when regular phones became cordless, so that you could carry them around in your apartment. Now you can carry them anywhere and that's what attracts people," suggests a 22 year-old woman.

Besides easy communication, another important aspect for cell phones' popularity has been cited as coordination.

> They have revolutionized the way we organize our meetings, by allowing us to travel with uncertain knowledge. If I am to meet someone at a bar across town, but don't know exactly which one, I can leave immediately knowing that I'll be able to get more accurate information as I get closer. People no longer have to wait for a call, or 'wait by the phone.'

It is common to observe in the streets of L.A. something that is not yet popular in Brazil: the ubiquity of work places. When asked about the reason for the popularity of cell phones and nomadic technologies, one non-user answered, "Before nomadic technology, people did their work at work, or at least in an area similar to a typical workplace. Now people can be seen typing at cafes, on airplanes, at the zoo, anywhere they can get a signal." In fact, it is normal to watch people even in buses with their open laptops, working in the in-between time of going from one place to another.

Although availability was definitely connected to cell phones, North Americans do estimate private spaces and like to clearly divide work hours from leisure hours. In Caporael and Xie's exploratory study about cell phones in the U.S. and China, they asked about the acceptability of employers calling employees outside of usual business hours (In: Katz, 2003, p. 223). For most Chinese participants, work calls during non-work hours were acceptable. Yet the North American group found calls during non-work hours largerly unacceptable. In order to distinguish work and leisure hours, most participants in the U.S. either used caller ID to avoid unwanted calls, or simply turned the phone off. "Americans had several reasons to turn off their phones, including (…) when not calling out or while recharging batteries." Actually, among the Internet survey half of the users affirmed they do not leave their mobile phones always on. Some said that they had their cell phones usually off, while others turn them off mostly at night, when they get home.

Similarly, there's a bunch of places in which the cell phone might be on, but a call would not be answered. In addition, cell phones should be silent in these places. Caporael and Xie (*Ibid.,* p. 224) found out that "both Chinese and Americans participants turn their phones off or switch them to silent mode in theaters, concert halls, churches, and some meetings." Also they turn off their phones on social occasions with friends and family. In the Internet survey, places where users would not answer a call include, in order of priority: restaurants, movie theaters and theaters (social places), work or work meetings, when out with friends or informally talk to somebody else, during classes or lectures, and lastly in cars and public transportations. The use of cell phones in these situations is considered "rude." Sometimes users just do not want to disturb or interrupt any other previous situation.

While cell phones are mostly viewed as communication tools, they are still very carefully used in social situations; users are mostly concerned with not disturbing others, and not mixing personal and private spaces. Because cell phones are mostly used to voice communication (there was no other type of answer to this question in the survey) many users simply turn off the phone when it should not ring. Unlike in the U.S., cell phones in Japan and Finland are always on, mostly because people do not use them to speak, but rather to access data or to send text messages, which theoretically do not disturb anybody in the vicinity.

Concerning the change in our perception of space, while most users pointed out the shrinking of distances and the concern with the merging of borders between public and private, one user realized something interesting: "Maybe they (cell phones) extend our subjectivity of previously closed, solitary spaces—like rooms, elevators, cars—into other spaces, both virtual and real." As a result, people do not feel lonely if they have a cell phone, because they can be connected to the outside world. Similarly, while in a chat in the Internet, users also feel like not being alone. The cell phone now also enacts the role developed by the computer screen. The difference, however, is that the cell phone travels with the user, interconnecting more firmly digital and physical spaces.

The merging of borders between physical and digital has been perceived as already happening. “WiFi in particular has whetted my appetite for ubiquitous access. I often wish that my laptop was connected to the Internet when I am in meetings.” Indeed, it is very common to observe people even in lectures looking at their PDAs and laptops. They can be making notes about the lecturer, but also sending and receiving e-mails, or talking to other people in chats. As long as this distant intervention is not loud, they are socially acceptable.

As cell phones are mostly used for two-way communication, several users do not agree that they can be used to create communities, or even a broader communication relationship different from the normal telephone conversation. The development of multiplayer games with cellular positioning systems is still very recent, and it seems that it is hard for people to make the connection between cell phones and communities. Furthermore, mobile Internet access is not popular: The connection is expensive, generally achieved via a WAP browser and GPRS circuit-switched connection. According to an article from Wired News,

> in 2000, many analysts said the popular I-mode mobile Internet services in Japan wouldn’t take off in the States because of sociological differences between the two cultures: Americans are too reliant on desktop computer Internet access, which is almost non-existent in Japan. (Batista, 16 Oct. 2002)

Nevertheless, analyst Ray Jodoin from the market research firm In-Stat/MDR suggests, “I would say that Americans want (high-end cell phones) just as badly as the Asians do. They just, unfortunately, haven’t had an opportunity to get to them” *(Id.).* Cell phone usage in the U.S. does not substantially differ from its use in Brazil.

7.2.2. Brazil: a bursting new culture or only following the U.S.?

Recently it has been published that Brazil is one of the countries in the world in which cell phone ownership grows faster (Plant, 2001, p. 77). Other countries are Russia, Romania, India, Venezuela, and Chile. Numbers are also impressive: more than 40 million cell phone owners in 2003.[26] However, according to the International Telecommunications Union,[27] in 2002 the penetration rate was only 20.06%, which can be compared to Argentina (17.76), but it is smaller than Mexico (25.45%), Paraguay (28.83%), Venezuela (25.55%), and Chile (42.83%).

We also dare not forget that socially and economically Brazil is considerably different from the previously analyzed countries: the United States, Finland, and Japan. Yet Brazil becomes an interesting case study when compared to other countries in Latin America because the number of cell phones in this country is definitely the largest one.[28]

These numbers get even more representative when compared to Internet use. As cell phone maintenance costs are cheaper than in the past, with more people in lower economic classes affording a mobile, cell phone ownership is already higher than fixed Internet subscriptions. In 2000, 32% of the richest Brazilians were online, but only 2.1% of the middle-income groups surfed the Net (Helft, 09 May 2000). These numbers reflect the low penetration rate for the Internet in the country: only 8% in 2002, a total of 14 million users.[29] PC ownership follows the same model. The International Telecommunications Union published that there are roughly 13 million PCs in the country, which stands for 7.48% of the population. When compared to 40 million numbers of cell phones, PC ownership is almost irrelevant. Even though one can argue that PCs can be used by more than one person, like landline phones, the name itself (personal computer) suggests that one PC should be owned by one user. Therefore, it is worthwhile to compare mobile phones and PC ownership, both as "personal items." However, cell phones are even more personal items than PCs. Probably PCs are shared more frequently than mobile phones because they have a specific place at home or at the office. Laptops thus are more personal than desktop computers, simply because owners can carry them around. Following this logic nomadic technology devices require individual use, even if eventually they can be briefly lent or collectively used.

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[26] Source: Teleco. Available at: http://www.teleco.com.br/ncel.asp. Accessed on: 18 Jan. 2004. In the end of 2003, there were 46,373,266 cell phones.
[27] Source: ITU, 2002. (International Telecommunication Union) Available at: http://www.itu.int/ITU-D/ict/statistics/. Accessed on: 17 Dec. 2003.
[28] The only Latin American country that approaches Brazilian numbers is Mexico, with 26 million cell phones in 2002. Other countries are under 6,500. Source: ITU. *(Id.)*
[29] Source: ITU. *(Id.)*

The analysis of cell phone growth would be worth nothing if we could not project into the future, imagining what will happen when all these personal devices contain Internet capabilities, and the ability to send and receive digital data is extended to all cell phone owners. The popularity of the Internet will extend into non-privileged classes. Moreover, uses for the mobile Internet might differ substantially from the fixed Net. First, it changes because it is mobile. Second, it acquires different meanings because a broader spectrum of people, from different classes and backgrounds, will use it. Nevertheless, currently cell phones in Brazil are rarely used to access the Internet. Like in the U.S., cell phones in Brazil are still mostly used to speak. Moreover, similar to the United States, there seems to be also no apparent connection between cell phone users and Internet users.

While cell phone use and Internet use are not connected, frequently mobile phones are replacing fixed phones in this country. There are several reasons why cell phones in Brazil are more popular than fixed phones. Unlike Japan, where size and portability are critical features, in Brazil price is the driving factor. The introduction of prepaid phones increased cell phone ownership exponentially. Today prepaid cell phones represent 76.24% of the total number of mobile phones in the country.[30] With prepaid cell phones, users are able to control their costs, buying one phone card a month, and waiting until the next salary, even if the card is empty. Also, many people use their cell phones just to receive calls, avoiding a monthly bill.

The cell phone service was introduced in Brazil in 1991. Prepaid mobiles arrived only in 1998. Since then, there's practically no growth in regular cell phones, whereas prepaid phones increased from 0 to 30 million.

[30] Source: Teleco. Available at: http://www.teleco.com.br/ncel.asp. Accessed on: 18 Jan. 2004.

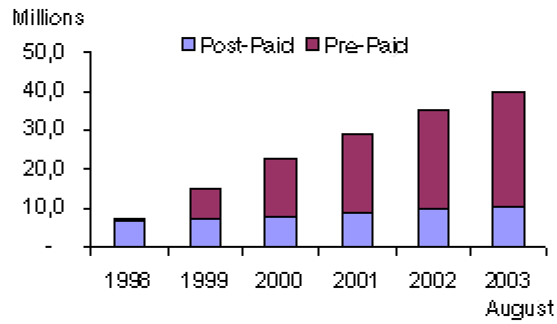

Table 1: Evolution of the prepaid phone in Brazil.

A recent research study from IBGE (Brazilian Institute of Geography and Statistics) shows that there was almost no growth in fixed telephones in the country during the year 2002.[31] This is partially explained because high economic class already has fixed phones. The IBGE survey mentioned that 99.3% of the population that earns more than 20 minimum salaries a month[32] owns a fixed phone. Similarly, 97.2% of households with income from 10 to 20 minimum salaries have landlines. However, just half of the population with income from 2 to 3 minimum salaries has phones and this number just decreases when the income goes lower. For example, among the population that earns one minimum salary or less, only 18.8% has a fixed phone at home. Having a fixed phone means paying in average R$35.00 a month (US$10-15), which represents 15% of the Brazilian minimum salary, and additional minutes spoken on the phone. Inside this context, buying a prepaid cellular phone is a cheaper option for the low-income class. The number of homes with only cell phones grew 15% in 2002, compared to the 7% growth of fixed phones.

These numbers also vary depending on the region. While in the Southeast 72.6% of households already have fixed phones, only 37.4% of the Northeast population has access to the service. The number is also lower in the interior of the country. According to journalist Andrés Velázques (05 Aug. 2002), "the deficient infrastructure and the difficulties imposed by geography make the cell phone the only option in many regions (of Latin America). In Paraguay, for example, there are five times more cell phones than

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[31] Fonte: Teleco. Available at: http://www.teleco.com.br/comentario/com16.asp. Accessed on: 21 Oct. 2004.

[32] In October 2003 the minimum salary in Brazil is R$ 240.00 per month (roughly US$ 84.00).

fixed phones."[33] Similarly, cell phone ownership growth in the Center-West region of Brazil was the largest in the country in 2003 (22.1%), followed by 20.8% in the North and 15.5% in the Northeast, because the landline infrastructure in these regions are still precarious. There has been little growth in the South and Southeast, which are the most economically developed regions in the country, in which inhabitants already have landlines *and* cell phones.

Until recently, fixed phones in Brazil used to take years to be installed. In 1998, the Brazilian Telebrás was privatized, increasing the number of fixed phones and decreasing the installation waiting time. Nowadays, one has to wait around 10 days to have a fixed phone installed, paying an installation fee of roughly R$100.00 (U$ 30.00) However, maintaining a landline is expensive for a large part of the population. As a consequence, in August 2003 the Brazilian Telecommunications Agency (Anatel) published that the number of cell phones surpassed fixed phones. By the way, the UIT attested that in 2002 the number of cell phones surpassed fixed phones in three continents: Africa, Europe, and Oceania. In America, the cell phones' rate still represents 43.10% of the total number of phones, mainly due to the solid landline infrastructure of the U.S., with 60% of fixed phones in 2001.

The introduction of CPP (calling party pays) in Brazil has definitely also decreased cell phone costs and increased their use. Before the CPP, both caller and receiver of the cellular call paid for the "air time," the transient use of the bandwidth. "This policy was based on recognizing the cellular telephones as wireless communication devices rather than as landline telephone. The regulators viewed as unjust that those who received telephone calls had no way of controlling who called them, and thus their charges" (In: Katz, Aakhus, 2002, p. 31). The U.S., for example, has no such a thing as CPP. Yet while in the United States calling a cell phone from your home fixed phone does not result in extra charges, in Brazil it is four times more expensive. Among fixed landline services, there is one in Brazil which includes blocking calls to cell phones.

With the above-mentioned facts, it is no surprise that a great part of the users in the Internet survey I conducted answered that one of the reasons for the popularity of cell

[33] "A infra-estrutura deficiente e as dificuldades impostas pela geografia tornam o celular a única opção em muitas áreas. No Paraguai, por exemplo, existem cinco vezes mais telefones celulares do que fixos."

phones are low prices. Low prices have been generally associated with prepaid phones, and convenience for buying and maintaining the phone. A 27-year-old user from Rio de Janeiro said that mobile phones became popular "because of the low prices for buying and also because the consumer can save calling costs (in the case of prepaid phones), sometimes even disregarding fixed phones."[34] Another 32-year-old user from Rio declared that he already disregarded his fixed phone: "A cell phone can be expensive, but if you have a medium monthly cost, and if the operator gives you fixed paying plans, I think it is not worth to have a landline… mainly if your Internet connection is via cable."[35]

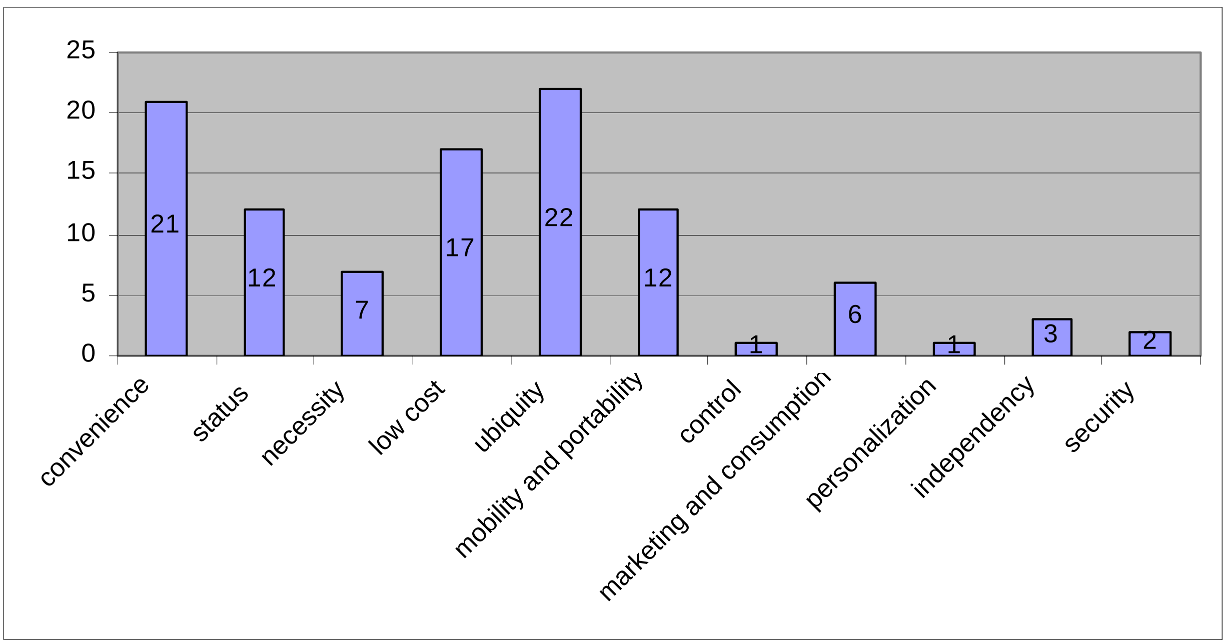

Table 2: Why are cell phones so popular?

(Number of answers among 96 users—some users indicated more than one reason)

Although users generally indicated more than one reason regarding cell phone popularity, most focused on the ability to be accessed anytime, anywhere (ubiquity). The

[34] "Atualmente, pelo barateamento dos preços para aquisição e pela possibilidade do consumidor dispensar gastos com as chamadas (no caso dos pré-pagos), dispensando, muitas vezes, até mesmo telefones fixos."
[35] "O telefone celular é caro, mas se você tem um consumo mensal médio e se a operadora oferece planos de pagamento fixos, acho que vale a pena não manter mais uma linha… principalmente se sua Internet for a cabo."

feeling of ubiquity has been expressed by answers such as, "it makes communication easier," "it is easier to localize and to access people," and "immediacy." A 26-year-old user from Matozinhos (in Minas Gerais state) emphasized the "possibility of being found and to find people independent of where we are."[36] Similarly, answers to question 5 in the second part of the questionnaire, which inquired whether cell phones promote communication or isolation, mostly supported communication (46%), contrasting to 7% of users who declared cell phones do isolate people from each other. However, 13% agreed that it depends, since cell phones can isolate people in physical space and connect them in virtual spaces. In this sense, cell phones are viewed basically as another type of telephone, which detach people from physical space and from the nearby environment, immersing callers in a placeless communication space.

One user underlined that it might help communication, but not community formation. "Communities are only formed by common interests, and the cell phone is not yet used with this goal, mainly due to economic reasons."[37] Economic reasons include poor interfaces, inexistence of 3G phones, and non-availability of advanced services for the part of the population who decide to have a cheaper phone and no monthly bill. As we have seen, this approach does not differ substantially from the North American perspective in which cell phones are mostly used for two-way communication. In the U.S., reasons for the restricted use of cell phone are not economical, but political, as we have stated earlier. This situation is different in European and Asian countries, mainly because cell phones are used for other purposes rather than just talking to one person at the other side of the line.

Yet some users pointed out exactly the dependency of this perpetual contact as the major problem concerning the future of mobile communication. "I think the biggest problem is the psychological dependency of these new technologies. People simply cannot unplug from their computers and cell phones…"[38] said one 22-year-old user from Fortaleza. Likewise, a 34-year-old user from Salvador suggested, "the anxiety for communication seems to be the worst problem, that is, the incapacity of disconnecting.

[36] "Pela possibilidade de ser encontrado e de encontrar pessoas independentemente de onde você esteja."
[37] "Comunidades ainda só se formam por interesses comuns, e o celular ainda não se presta a isso de forma completa, principalmente por razões econômicas."
[38] "Acho que o maior problema é uma 'dependência psicológica' dessas novas tecnologias. As pessoas simplesmente não conseguem se 'desplugar' de seus computadores e celulares…"

Therefore, the person loses his or her capacity for contemplation and acquires an anxiety for the new: the latest news, the fear of isolation, and the superficial information access."[39] Do nomadic technology devices bring only speed, superficiality, and dependency of contact? The advantages of mobile phones and the necessity of contact have also been very strongly considered by users, raising even emotional reactions like, "I hate people who have their cell phones always off or who leave them in the voice mail,"[40] complained a 25-year-old user from Belém.

Secondly, users responded that cell phones are popular because they are practical and convenient. This topic also includes answers like "makes life easier," and "we can communicate with our family and with our work in order to solve any urgent problem. It is really convenient."[41] Another 24-year-old user from Manaus suggested that they are popular because of the "ease they can speed up many issues, from anywhere. One can move through space and even thought solve distant problems."[42]

Mobility and portability are other important factors for cell phone popularity. Mobility is related to the ability to move around space while communicating. Portability is connected to the design of the cell phone, which can be easily carried around. Of course these answers are also related to ubiquity, but as it has been previously stated in chapter 6, mobility does not necessarily mean ubiquity. Some users were merely focusing on the ability to move around with the interface, without essentially emphasizing always-on connection or availability. A 31-year-old user simply said, "because it allows mobility, you can use it while you are in movement."[43]

Especially in big metropolises like Rio de Janeiro, where distances are huge and where people do not have time during the week to see family and friends, the cell phone is considered almost a necessity.

> The use of cell phones helps communication among people, approximating them because it is easier to communicate. It ceased to be a luxury device to be a necessity, due to the everyday speed

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[39] "A ansiedade comunicativa me parece ser o mais grave problema, ou seja, a incapacidade de se desconectar. O indivíduo perde a capacidade contemplativa em prol de uma ansiedade do novo: das últimas notícias, do medo do isolamento e da degustação superficial das informações."
[40] "Odeio pessoas que vivem com o celular desligado ou que deixam com as 'secretarias'."
[41] "Podemos nos comunicar com a família e com o trabalho para resolver algo urgente. É realmente cômodo."
[42] "Pela facilidade e funcionalidade com que podem agilizar muitas coisas, a partir de qualquer lugar. Você pode se deslocar e mesmo assim resolver questões distantes."
[43] "Porque dá mobilidade, porque você pode usá-lo enquanto se locomove."

> of life. It is also an instrument that allows fast solutions to professional and personal problems.[44] [20 year-old girl from Santa Maria (Rio Grande do Sul state)]

Another girl from Rio affirmed that cell phones are important for communication, especially to help people in the community. "I've already helped someone in a theft by calling the police immediately from my cell phone."[45]

Interestingly, a considerable amount of users still consider cell phones merely as devices that represent status to the owner, connecting its popularity to marketing campaigns. "Not having a cell phone today is a shame, for most people,"[46] said a 30-year-old user from Rio de Janeiro. Like teenagers groups in Japan, having a cell phone in Brazil sometimes determines whether you belong to a social group or not. An 18-year-old teen from Santa Maria (Rio Grande do Sul) affirmed that cell phones are popular "first because they confer status, at least in the beginning… I think it is fashion… Having a cell phone has already become a requirement 'to be in.'"[47]

Indeed, another 31-year-old user from Niterói (Rio de Janeiro state) suggested that people

> still connect cell phone ownership with social status. In the beginning of the 1990s, when this technology arrived in Brazil, it was very difficult to acquire a habilitation to use the device, and only people who could pay (a lot) would have quick access. Therefore, I believe that this idea still inhabits popular imaginary.[48]

In 1990 the Brazilian state-run operator, Telebrás, "demanded from subscribers a guarantee deposit of USD$ 20,000 just to enable a phone line," tells journalist Ethevaldo Siqueira (04 Jul. 2001). Surprisingly, even under these conditions the operator managed to sell two thousand subscriptions just in Rio de Janeiro. However, it seems that the focus on social status tends to disappear whenever cell phones become ubiquitous.

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[44] "O uso de telefones celulares ajuda a comunicação entre as pessoas, promove a aproximação pela facilidade de comunicação e, na medida em que deixou de ser luxo para ser necessidade devido à correria que o dia-a-dia desencadeia, é um instrumento que acarreta soluções rápidas para problemas de cunho profissional, ou mesmo pessoal."

[45] "Já livrei uma pessoa de um assalto acionando a polícia imediatamente do celular."

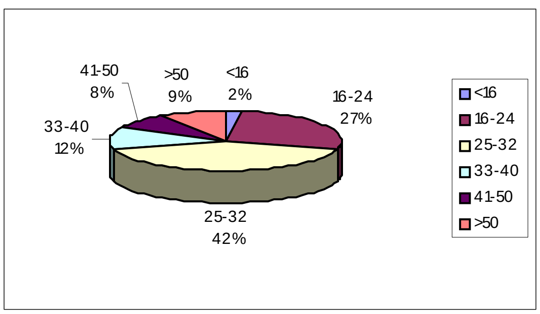
[46] "Não ter celular hoje é passar vergonha na opinião da maioria."

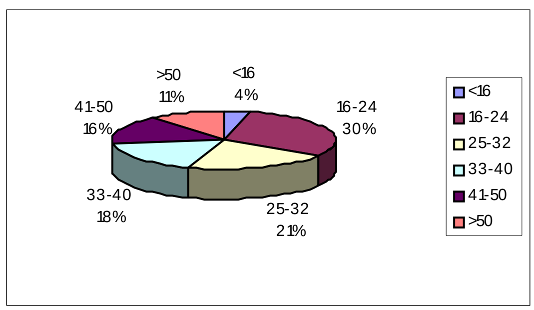
[47] "Primeiro porque conferem status, ou pelo menos conferiam no início… Acredito que seja modismo… Ter celular já virou pré-requisito 'to be in'."

[48] "ainda se associa a sua posse com um status social. No início dos anos 90, quando essa tecnologia chegou ao Brasil era muito difícil conseguir habilitação para uso do aparelho e só as pessoas que podiam pagar (caro) tinham acesso mais rápido. Daí, acredito que essa idéia ainda povoa o imaginário popular."

Researchers Virpi Oksman and Pirjo Rautiainen (In: Katz, 2003, p. 300) in a study about Finnish teenagers and children's relationship to cell phones suggest that after several years of use, many have altered their attitudes toward the device. "The status symbol of early days has become merely a tool for organizing everyday life, a natural part of life that teens no longer discuss with as much enthusiasm as when the mobile device still possessed the charm of novelty." Many teens stated that it is no longer cool to talk about new phone features and models, because they are so common. Perhaps this attitude is still going to happen in Brazil, or perhaps it is already happening among younger users, such as children and teenagers, who were not the major part that responded to the Internet survey.

Most users who responded to the questionnaire ranged from 25 to 32 years old (42%), followed by 27% between 16 and 24. A small amount was between 33 and 40 (12%) and the rest (16%) above 41 years old. A recent survey from Ibope[49] (LatinPanel) indicated that the majority of cell phone users in Brazil are between 16 and 24 years old. This range represents 30% of the subscribers. Secondly, a large amount is represented by consumers between 25 and 32 years old (21%). The following ranges are users between 33 and 40 years old (18%); between 41 and 50 years old (16%), and finally, more than 51, representing 11% of the users.





Tables 3 and 4: User's age of those who answered the Internet survey (left) and the result of the Ipobe survey in Brazil, by age (right).

[49] Available at: http://www.ibope.com.br/latinpanel/ogrupo/empresas/latinpanel/principal.htm. Accessed on: 15 Jan. 2003.

Different from the results in the U.S. questionnaire, most of these users (58%) had their cell phones always on. Surely this fact is connected to the importance of perpetual contact considered as one of the main advantages of cell phones among users. Also it might be that people do not separate so strictly public and private lives, or because they use their cell phones mostly for personal matters. In fact, as much as 71% of the interviewed people affirmed they use their phones mostly in personal contexts. The ones who affirmed they do turn the mobile off, or argued they would do so at home, at night (in situations in which most users have fixed phones), or in public places, like movie theaters, work meetings and classes, where most users also said they would not answer a call.

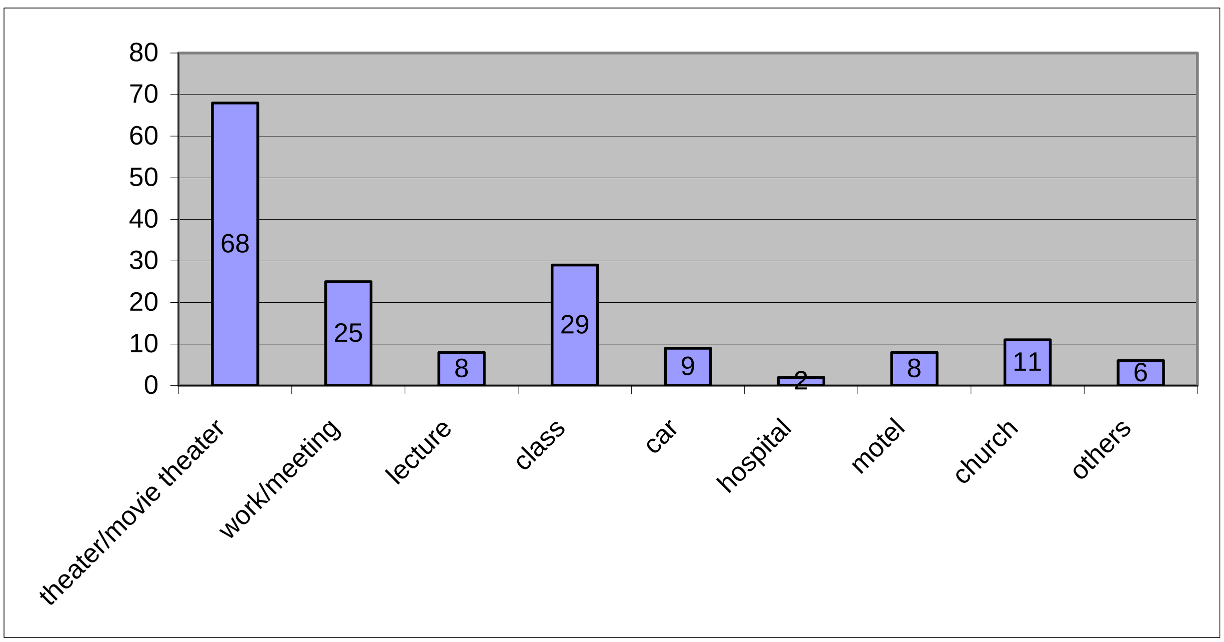


Table 5: Where would you not answer a call?

The reasons for not answering calls in these places are, as expected, respect for others, and/or not interrupting a previous act or happening. The few users who responded they would not answer a call while driving referred to the fear of getting a ticket or because it is dangerous. Some users indicated more than one reason for not answering calls, showing that also in Brazil a culture toward cell phone etiquette is being created.

The increasing ownership of mobile devices demands the emergence of cultural rules, through which people know where they should or should not use the mobile.

Especially because cell phones are mostly used to speak, the awareness of not using the cell phone in specific places is important to maintain a respectful environment. Except for one 18-year-old boy who stated in the Internet survey that he used the mobile mostly to send SMS, the other 94 people responded "speak" to this question. Indeed, the A.T. Kearney report (2003) affirms that only 2% of cell phones users in Brazil send SMS regularly, and 8% use it eventually. Moreover, 90% of cell phone subscribers have never used the service. Among SMS users, half of the subscribers under 24 years old use the service more than once a day. Older users do not even use it every day. If SMS is still not popular, the same is true for the mobile Internet. As a result, cell phones behave like mobile telephones, ringing anywhere in public spaces. In this context, users do consider incoming calls as interventions (sometimes not welcomed) in the nearby context.

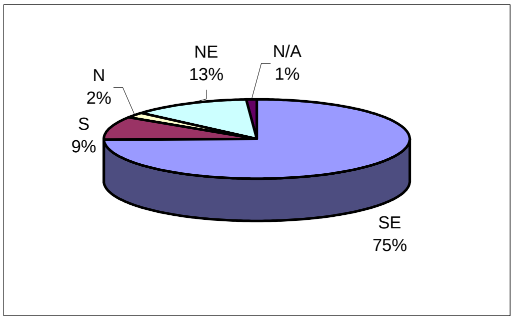
> All situations described above (church, theater, movie theater, work meeting, workshop, lecture) require respect with the other and it is very uncomfortable when our though is interrupted by the sound of a cell phone. Generally when finishing a call, the user is very embarrassed and the person who was interrupted is completely lost until she orders her thoughts again.[50] (43-year-old user from Rio)

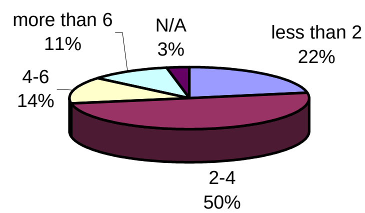
One user affirmed he just turns his cell phone on when he needs to make a call. The same user also suggested as one of the reasons for the popularity of cell phones the task of filling up people's empty social lives. Although this opinion has not been shared by any other user, Sadie Plant (2001, p. 49) in fact affirms in the Motorola Report that some lonely users would go to a bar or a restaurant and place their cell phones on the table in order not to feel alone. Only the feeling that they might receive a call would be enough to make them feel accompanied. Furthermore, those who were worried about their social status would pick up their phones and pretend to be talking to somebody else, so other people in the same environment would not see him or her as a lonely person.

Among the 96 people who answered the questionnaire, most lived in the Southeast region (71) and most had cell phones for more than 2 years but no longer than

[50] "Todas as situações descritas acima (igreja, teatro, cinema, durante uma reunião de trabalho, em um workshop, uma palestra) requerem respeito para com outras pessoas, e é muito desagradável quando nossa linha de raciocínio é interrompida pelo som de um telefone celular. Geralmente, ao terminar a chamada, o usuário do celular fica bastante envergonhado e a outra pessoa que foi interrompida fica totalmente perdida até tentar colocar o raciocínio novamente em ordem para prosseguir."

4 years, representing that most users acquired their cell phones between 1999 and 2001. As previously stated, cell phone ownership indeed grew in Brazil after the introduction of the prepaid phone in 1998. According to Anatel, there are more recent than veteran cell phone users.





Tables 6 and 7: Number of answers by region (left)
and amount of time of cell phone ownership in years (right).

When asked about whether cell phones transform our experience of space, most users agreed that mobiles do change the way we understand geography, shrinking distances and approximating people. However, most users referred to space as physical space, not a hybrid space merging physical and virtual. The ones who did not agree with the transformation of the space experience, emphasized mostly what was also clear for the first group: "cell phones are mainly extensions of the normal telephone," and "cell phones can change the experience of space, but not the concept of the real."

One user from Rio suggested that with the cell phone "the communication space becomes any space, and not only specific places, like a public telephone or a place where there is a fixed phone. Some situations are now possible, such as changing the place of a meeting minutes before it happens."[51] Micro- and macro-coordination are now common also in Brazil. People also become somehow loose about space and time. More important, people realize that telephones are no longer connected to places, but to people. A 26-

[51] "O espaço para se comunicar com alguém passa a ser qualquer espaço, e não somente determinados locais, como uma cabine telefônica ou onde exista algum aparelho. Situações que antes não eram possíveis passaram a ser, como, por exemplo, trocar o local de um encontro, momentos antes de ele acontecer."

year-old user from Salvador (Bahia state) attested that “nowadays you do not call to look for somebody. You call the person directly.”[52]

Regarding the redefinitions of borders between the virtual and the physical space, it is interesting to see how diverse people’s opinions are about what is virtual. Consequently, the question assumes completely different connotations. Generally users thought about virtual as indeed disconnected from physical (the virtual from cyberspace), but agreed that it would eventually come closer to physical due to nomadic technologies. Although many users inquired what virtual means, a 23-year-old user from Rio in fact questioned, “What is physical?”

> Actually I don’t believe in “borders” between physical and virtual. What is physical? Is the electric energy that circulates on the chips of a laptop and makes its binary code process information physical? Cyberspace, to me, is as virtual as speaking on the phone, or perhaps sending a letter by mail. In all cases, you are not there, face-to-face with the other part. Cyberspace (I think this word is horrible and empty), however, exceeds a telephone or a letter in its range of possibilities.[53]

While reading this answer, I could not help thinking about nanotechnology and quantum mechanics, mentioned in the former chapter, in which the borders between matter and energy are indeed not defined, in which particle’s behaviors are unpredictable and in which everything is simultaneously information *and* matter. In fact, everything has always been information *and* matter. The emergence of the idea of cyberspace, influenced by cybernetics theory helped to disconnect both ideas.[54] However, today the development of nanotechnology, quantum physics, and nomadic technology devices contributes to create the awareness that physical and virtual have always been connected.

Almost all users answered that cell phones promote a greater connection to physical space instead of detachment from it. Probably due to the fact that cell phones in Brazil are mainly used to talk, the connection to things such as *immersion* and *virtual spaces* is very distant to the common user. “With the poor interfaces cell phones currently

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[52] “Hoje você não liga mais para procurar por alguém, você liga diretamente para a pessoa.”

[53] “Na verdade, eu não acredito nessas ‘bordas’ entre o físico e o virtual. O que é o físico? A energia elétrica que circula pelos chips de um laptop e faz com que seu código binário processe informações é física? O ciberespaço, para mim, é tão virtual quanto falar ao telefone ou, talvez, mandar uma carta pelo correio. Afinal, não é você que está ali, frente a frente com a pessoa. O que o ciberespaço (eu acho essa palavra horrorosa e vazia) tem de mais é apenas um leque de oportunidades muito mais amplo do que a carta ou o telefone.”

[54] See chapter 1.

have, I don't feel like I am in front of a computer in the Internet. I use cell phones just to send SMS and speak,"[55] tells a 31-year-old user from Rio de Janeiro.

Consequently, we are compelled to start thinking about the future of mobile interfaces. Answers to this question included perspectives as different as "convergence," "intuitive and friendly interfaces," "miniaturization," "voice control," "transparency," and "mobile Internet." There might be lots of possible future developments for mobile devices; many have already been cited. However, no matter which specificities will be developed, interface designers will have to learn how to deal with mobility, personalization, wearability, transparency, and location awareness.

The development of the mobile Internet is the great expectation for users and developers. It seems that the tendency now connects information access with location awareness and multi-cast communication, as is the case of games. Just an interesting example, in October 2003 cell phone developer company Kyocera invited scholars and industry participants to discuss in the faculty center of the University of South California new applications for wireless location-based services. Aware that these services are already advanced in Asia and Europe, they look for new perspectives in the United States. Kyocera's call for participation in the event said,

> Today over 100 different location-based services are available in Japan, ranging from bracelets to let parents track their kids in the park, to cell phones that point the way to cheap noodle shops in Tokyo's skyscraping Shinjyuku district. In Korea, two million citizens use their cell phones to locate nearby friends and find the most convenient coffee shops for impromptu meetings. In Europe, cell-phone networks can locate users and give them personalized directions to Big Ben or the Eiffel Tower.

Basically the company wants to focus on (1) which tasks users will want to perform with access to location-based services and (2) how user behavior might differ across different environments, in a different way from Europe and Asia. In Brazil there were no location-based services available in 2003. However, already in 2002, looking forward to future development in this area, Compera, a Brazilian wireless company announced a partnership with LocationNet, the global technology leader in wireless location-based services. Some future mobile applications in the company's list are the

[55] "Com a atual pobre interface dos celulares eu não me sinto como estivesse em frente a um computador na Internet. Uso celular muito para enviar SMS e falar."

GoKiss, **GoQuiz** and **GoChat**. All three products focus on teenargers as the target public. According to a press release from LocationNet (01 Mar. 2002), the "**GoKiss** is a location-based dating application that links profiles of people with their romantic match based on proximity." In this sense, it is very similar to the **Lovegety** already existent in Japan. Moreover, "**GoChat** servers as a location-based instant messaging application to allow people to chat with others in the same locale"*(Id.),* like the **ImaHima**. Finally, the "**GoQuiz** offers users the ability to play location-based trivia games with provided questions based on their respected location" *(Id.).* However, according to Paulo Henrique Ferreira,[56] Compera Press Spokesman, there is still no space in the Brazilian market to invest in such services. Currently operators are struggling to make most basic services popular, like SMS and MMS. Yet tests in this sector are already underway. According to the online magazine **Cellular-news** (17 Oct. 2003), the Brazilian operator Oi "has conducted successful trials of the new Matrix high accuracy location technology from Cambridge Positioning Systems (CPS), in the Recife region (Pernambuco)."

2,5G cell phones are already on the Brazilian market since 2002, with features like circuit switched data transmission (GPRS), Internet connection (WAP), e-mails, SMS, and MMS. The recent A.T. Kearney report (2003) stated that 38% of cell phone subscribers in Brazil have cell phones with Internet access, but only 31% of this amount really uses Internet via cell phones.

Some innovations might contribute to a greater integration between cell phones and mobile Internet, like the technology standardization, and colorful displays. As previously stated, in 2003 GSM technology already represents the majority of cell phones in Brazil,[57] showing that the country is moving toward the European system. The fact that Brazil decided to follow the American standard (mixing different non-compatible mobile technologies) instead of the European might represent one of the reasons why the country does not have as many services as in Europe and why cell phone usage is very similar to the U.S.

However, differently from the American and the European behavior, in Brazil "there is an attraction for the new" (Castaldelli, 13 Oct. 2003). This phrase can also be

[56] In an e-mail to the author. (02 Nov. 2003)
[57] The GSM technology has been introduced in the country in June 2002.

understood as “consuming.” The Ibope survey (LatinPanel) affirmed that 42% of cell phone users replace their phone in less than a one-year period. Thirty-five percent replace it between one and two years. Finally, 18% take more than two years to acquire a new device. However, when asked when they plan to buy the next phone, the situation changes substantially. Whereas in North America and Europe the 30% plan to change in the next year, in Brazil this number grows to 43%. Moreover, in Europe as many as 53% of users say that they are not yet even considering buying a new phone. In Brazil, however, most consumers buy one device already thinking on the next one. The chart below indicates that until 2001 in Brazil and Argentina, most of the cell phones on the market were the user’s first phones. In 2002 old users started to replace their phones. A projection foresees that from 2004 on the majority of the phones will no longer be the first owned mobile.

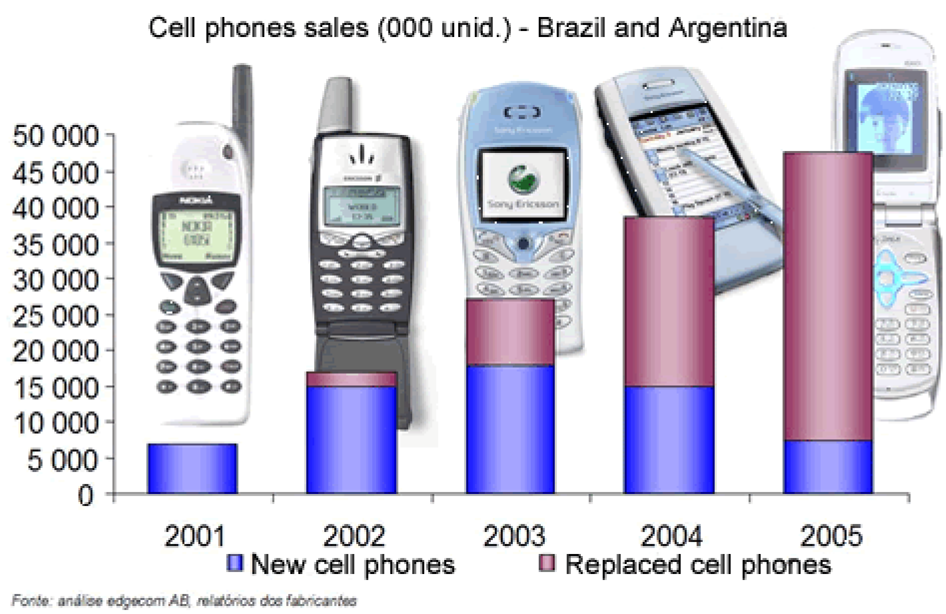

Table 8: Cell phones sales (000 units.)—Brazil and Argentina.

In Brazil ring tone download and multimedia phones are becoming popular. An article from **Jornal do Brasil** (newspaper from Rio de Janeiro) states that today “almost all operators offer the option to download ringtones and screensavers with better quality then in the Internet"[58] (Lopes, 14 Jul. 2003). Ringtones in MIDI format, which are able to simulate more complex sounds, are also currently popular in the U.S. Since the beginning of 2003 it is possible to hear all sorts of melodies and pop music in public spaces, which end up being a ringing cell phone. One of the reasons for downloading different ringtones to the cell phone is *personalization*. Users like to differentiate their cell phones from others', mainly arguing that with a personalized ringtone they can be sure that the ringing phone is theirs. Furthermore, it is also common to associate different ringtones with specific people in one's address book. "I like to differentiate groups in my address book by ringtone. When somebody from my family calls I know that it is important, but if it is a friend I have the option not to answer and call later,"[59] tells the 24-year-old student from Rio de Janeiro, Daniel Gotilla *(Id.)*. Another reason for having diverse ringtones is to differentiate cell phones from common telephones. A ringing cell phone in public spaces has been frequently regarded as annoying, disturbing, and impolite. Replacing traditional ringtones with pop music and other types of sound as diverse as the meow of a cat transforms phones from telephones into personal objects just accessible by the user. A ringing cell phone with a non-traditional tone does not disturb people nearby, because they generally do not think that the noise they hear comes from a cell phone.

Also beginning to emerge in Brazil are cell phones with the ability to download games and applications. Envisioning the evolution of mobile phones, in 2003 Vivo, one of the major cell phone operators in Brazil, announced the first MMS service using CDMA technology in Latin America.

> The first cell phone configured for MMS services is the Samsung Wist which features a built-in camera that rotates to take pictures, in addition to a built-in flash, rotating viewer, and the capability to store up to 100 pictures and display up to 260 thousand colors. The Twist also enables pictures to be e-mailed or messaged to another cell phone, and has the capability of transmitting both text and music. (Cellular-news, 30 Oct. 2003)

This evolution raises the question: what will be the use of mobile devices in the future? Current cell phone development indeed shows that location-based services, games, and multimedia content exchange might be the future of mobile technology. The

[58] "Praticamente todas as operadoras oferecem a opção de download de toques musicais e imagens com qualidade superior aos encontrados na Internet."

[59] "Gosto de diferenciar os grupos na agenda pelo toque. Quando alguém da minha família liga já sei que é importante, mas se é um amigo eu posso não atender e retornar a ligação depois."

chart below shows the evolution of mobile Internet technology over time in Brazil. While in 2002 cell phones were mostly used to send SMS and to browse the Internet with a WAP browser, in 2003 multimedia applications have been launched. These applications depended on the emergence of colored screens and included photo messages and weather forecast. Finally, in 2004 the market is expecting Java applications that enable video streaming, music, and the download of more sophisticated games.

Table 9: Evolution of cell phone technology.

A.T. Kearney asked users what they are currently looking for on the mobile Internet. In Brazil, 40% answered that they look for entertainment such as games, music, and ringtones. A smaller amount (33%) looks for static information, such as news and weather, and 32% is willing to communicate with other people. On the other hand, in Japan the majority of users (62%) use the mobile Internet for communication. The situation is similar in North America (25%) and in Europe (14%). Entertainment occupies the second place in North America (24%), but third place in Europe (11%) and Japan (32%).

Interestingly, the development of location-based mobile games, or pervasive games, is successful in Europe, a fact that just makes us wonder what it would be like if

Brazilian cell phones were equipped with the same features. Technologically, Brazil decided to follow the North American standards, and that's why cell phone usage in both countries is similar. Now with the standardization of technologies in America and in Europe, it might be that new usages for the mobile technology are created, which are going to depend on cultural and economic aspects, rather than technology.

> "For modern art, augmented space can be thought as the next step in the trajectory from a flat wall to a 3D space. For a few decades now artists have already dealt with the entire space of a gallery; rather than creating an object that a viewer would *look at*, they placed the viewer *inside* this object. Now, along with the museums, the artists have a new challenge: placing a user inside a space filled with dynamic, contextual data with which the user can interact." (Manovich, 2002, p. 22)

8. CHANGING OUR PERCEPTION OF SPACE: ART + MOBILE TECHNOLOGIES TRANSFORMING SPACES INTO PLACES

Artists and fiction writers address new borders between the physical and the virtual (real and imaginary), pushing further the limits of technology. Science fiction has always played a critical role in redefining these borders and envisioning future technical developments (**Neuromancer** is an example). Recent sci-fi movies addressed again the question *what is real?* playing with the relationship between physical and digital spaces. **The Matrix** (Wachowsky, 1999) and **The Thirteenth Floor** (Rusnak, 1999) are examples of movies that deal with the connection between the physical and the virtual by placing the virtual either inside our minds and/or together with physical reality.[1]

Traditionally, imaginary spaces and creatures have been created by travelers who used to go abroad and narrate about distant and unknown places. Moreover, new technologies have helped to nurture peoples' imagination, even in former eras in which "digital" was not part of the real. Imaginary spaces are also related to different interfaces responsible to present new and fantastic realms, which can be transmitted as text, like books, or images, like the virtual traveling devices from the 19th century.

In the end of the 20th century, the emergence of digital spaces due to the Internet promoted the creation of spaces for the imagination that could be shared, inhabited, and modified by groups of people who would gather "somewhere" outside physical space: multiuser environments. This new technological paradigm generated a novel relationship between the real and the imaginary, since the imaginary no longer belonged to a single person, but could be collectively inhabited and modified.

[1] For an analysis of both films, see chapter 2, **Defining Virtual**.

Currently, where is the place for the imaginary when digital space is no longer separated from physical space? The story we are telling in this dissertation suggests that the contemporary imaginary is created by the enfolding of spaces. There are two tendencies for the projection of the imagination in the post-virtual era, derived from this enfolding of spaces: one is related to the enfolding of contexts promoted by cell phones. In this case, cell phones bring distant and unknown contexts into the present context, thus nourishing the imagination of people who overhear conversations in public spaces. Another type of imaginary spaces created by cell phones is associated to the development of pervasive games, which reinterpret the city space, overlaying an imaginary narrative on the known city space. The other tendency projects the imaginary inside the really small, showing that there can be imaginary and unknown places even within the known. The study of nano particles, allowed by emergent nanotechnology studies, enfolds the small into the large, and the unknown within the known.

Art has also always represented spaces of the imaginary, besides enhancing the imagination of the observer/participant. This chapter addresses the two sides of projections of imaginary spaces (nano and mobile technologies) through art. Therefore, it connects mobile and pervasive technology, art, and science in order to define a new place for the imagination in a hybrid space. As hybrid spaces are mainly communication and interaction environments, this chapter also deals with the influence of media arts on transforming (impersonal circulation) spaces into (communication and vivid public) places.

The first seed of hybrid art could be perceived in some pieces that emerged inside traditional museums, as is the case of the work developed by artists Christa Sommerer and Laurent Mignonneau. These pieces started to require the participation of the observer, creating an interplay between virtual and physical spaces. With the further development of art mediated by technology, single pieces expanded for the whole museusm.

A case study about the exhibition **nano** explores the power of art mediated by technology to reconfigure museum spaces. Transforming the LACMALab (Los Angeles

County Museum of Art Lab) museum space during nine months,[2] **nano** exemplifies the reconfiguration of traditional museums by means of two distinct trends. First it creates a hybrid space that connects physical and virtual, inviting visitors to participate and use the museum environment in an original way. In the "in-between" space that connects art, technology, and science, the exhibition foregrounds what has always been one of the main issues of the creative process, the borders between real and imaginary. This is the second direction in which the science of nano particles shows us that imaginary spaces are migrating from the distant to the invisible, and from the digital to the hybrid.

There are basically two ways in which media arts contribute to the creation of hybrid spaces. One occurs inside museum spaces; the other happens in public spaces. The exhibition **nano** exemplifies the first case. The second case is represented by large-scale interactive installations placed in public spaces. Examples that will be discussed later include large-scale pieces such as Rafael Lozano-Hemmer's **Vectorial Elevation**. Finally, this chapter analyzes specific media art projects that use cell phones as interfaces. Among all possible uses and developments for mobile phones, artist and designer Joachim Sauter[3] views the cell phone as a powerful interface for artistic purposes. Media art is a potential field which redefines imaginary spaces, and creates hybrid spaces via mobile and pervasive interfaces.

8.1. Earlier examples of hybrid pieces

In chapter 1, I analyzed computers as simulation machines and exemplified how art dealt with this vision by creating simulation pieces that aimed to reproduce life and physical spaces in the virtual space of computers. Examples were Karl Sims's pieces, **Evolved Virtual Creatures** (1994), and **Panspermia** (1990). Later in chapter 4, I examined works that started to merge physical and virtual spaces, by the exploration of interactive simulations placed on museum spaces. In these pieces, visitors would interact with and influence a computer-modeled world that simulated artificial life. Examples were once again Karl Sims's **Galápagos** (1997), and the non-online version of Janet

[2] **nano** opened on December 14th, 2003 and will stay in LACMA until September 06th, 2004. More information at: http://nano.arts.ucla.edu. Acessed on: February 14, 2004.
[3] In a conversation with the author. (23 May 2004)

Prophet, Gordon Selley, and Rycharde Hawkes's **Technosphere** (1997). Nevertheless, the interaction with these pieces was limited. In Karl Sims's work visitors only had the choice to choose among twelve artificial creatures displayed on twelve monitors. The visitor's choice would then influence the development of the artificial life environment, but the user had no control over how the creatures would evolve. Similarly, **Technosphere** allowed users to create new inhabitants in the world, but once created, visitors could only access statistics and information about their creatures, without really participating in their development.

In the last ten years, however, works that merge more strongly physical and digital spaces began replacing experiments that created virtual spaces and creatures isolated from the physical space. Although still not representing a hybrid reality, these works contributed to define mixed and augmented realities, connecting physical and virtual spaces, allowing users to interact and influence all stages of the piece development.

Christa Sommerer and Laurent Mignonneau created **Interactive Plant Growing** in 1993 as an early attempt to mix physical and virtual spaces. The artwork uses actual live plants and deals with the growth of virtual plant organisms and their evolution in real time in the three-dimensional virtual space. By touching real plants, which are on the top of black pedestals in a dark room, users can influence and control the virtual growth of around 25 program-based plants, which are simultaneously displayed on a projection screen in front of the pedestals.[4] Following the idea of **Interactive Plant Growing**, Sommerer and Mignonneau developed **A-Volve** (1994/95), which also deals with the concept of artificial life, but instead of using plants, it works with fish and other aquatic creatures. **A-Volve** creates a full artificial life environment in which creatures can interact with each other, as well as with human beings. The creatures are designed by the user's finger; hence, they are not perfect fish-like beings. Each user draws a creature on a board, and this drawing is digitized, becoming an actual aquatic creature in a virtual fish tank. Each aquatic creature is able to grow by itself, to eat, to reproduce and to die. But unlike **Technosphere**, users are able to "hold" the virtual beings to avoid, for instance, a

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[4] Interactive Plant Growing is a permanent installation at the Zentrum für Kunst und Medientechnologie (ZKM) in Karlsruhe, Germany.

predator eating prey, thus influencing the global environment development. Users can also put two creatures together in order to encourage mating and offspring production. Another innovation of both **Interactive Plant Growing** and **A-Volve** are the interfaces used to connect to the virtual environment. The first piece uses live plants, while the second turns the user's body into an interface, with the ability to draw creatures with their hands and grab virtual life forms in the virtual tank. In contrast to Conway's **Game of Life** and to Sims's **Evolved Virtual Creatures**,[5] in which the simulation systems evolve by themselves without the need for any external input, **Interactive Plant Growing** and **A-Volve** need actual people for their evolution. Therefore, **A-Volve** and **Interactive Plant Growing** look for natural interfaces that allow the interaction with virtual environments. Moreover, they deal with the connection between physical and virtual spaces, since both pieces depend on human interaction to acquire full meaning.

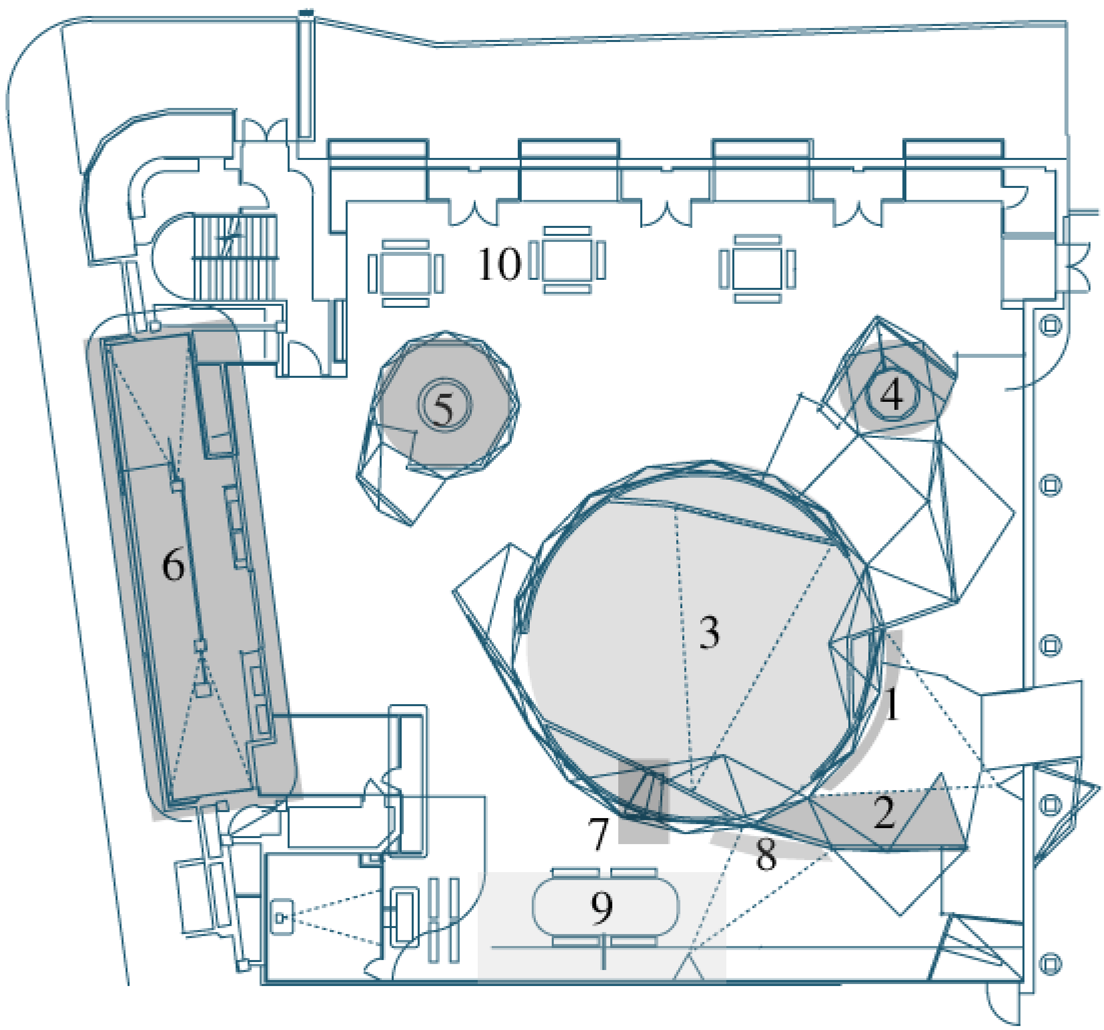
Sommerer and Mignonneau's work actually foresaw the development of the concept of digital space. Telepresence and telematic art have for a long time explored the interaction of virtual and physical spaces. However, during most of the 1990s, after the emergence of the World Wide Web, Web Art and artistic simulations overshadowed the development of this type of work. The word "interactivity" in this sense was mostly used to describe how the user could change the virtual world from the physical environment. Therefore the concept was based on bringing users inside the virtual space. The concept "interactivity" has been widely used to refer to art pieces, as well as game environments. Conversely, after the emergence of mobile interfaces and pervasive computing, "interactivity" also described changes in the physical world caused by distant contexts and places. Certainly this meaning of the concept has never been forgotten by telematic art. A fairly recent example is Ken Goldberg's **Telegarden,** cited in chapter 4. However, Sommerer and Mignonneau's work is singular because they started envisioning new types of interfaces in order to deal with simulation spaces, which had been formerly envisioned as disconnected from physical space. Their work started to insert a bit of physicality in the concept of cyberspace. Simultaneously, the "interactive" quality of their pieces contributed to implant the seed of change in museum spaces. As long as the visitor was no longer supposed to be static and act merely as an observer in front of the

[5] See chapter 1, **Defining cyberspace**, "a simulated world of information."

piece, museums needed to start thinking about how to adapt the exhibition space in order to involve human movement and interaction, both with the piece and with other visitors.

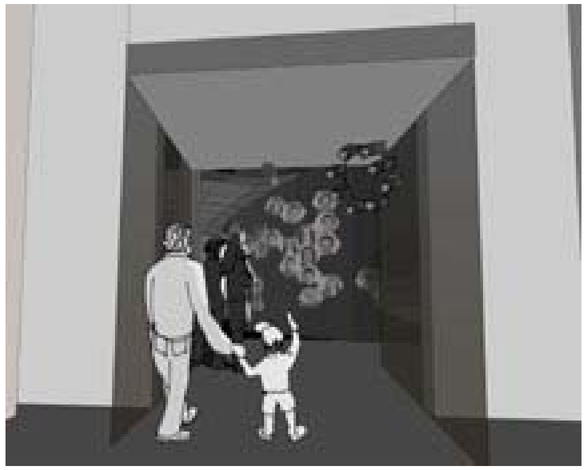
The ZKM in Germany is a pioneer attempt to create a media arts museum that would not follow traditional museum parameters. However, it was designed in order to allow interactions with individual pieces. LACMA's case is different because the concept of the exhibition is thought to work in the gallery space as a whole, connecting the pieces and transforming the entire space into an interactive and participatory place.

8.2. The invisible imaginary: museum spaces, hybrid reality and nanotechnology



Picture 35: nano floor plan.

8.2.1. Prelude to the imaginary: experiencing **nano**[6]



Picture 36: *ID space.*

(1) <u>*Entrance*</u>.[7] As I walk into the exhibition room, I see a "swarm" of cameras. One of them takes my picture, capturing my identity as soon as I enter **nano**. My face, as a product of this "unauthorized" surveillance, is then projected onto the wall in front of me, acquiring visibility among many of other pictures, forming a huge hive-like structure. Each face inhabits a hexagon, which is also part of the graphite molecule structure. Standing in front of this construction, I realize that the hive-like projection is a database of faces of people who have been in the exhibition before me. Observing the movement of people entering the exhibition room and being captured by the camera, I occasionally notice humorous aberrations, since the camera not only captures the visitors' faces but also everything it understands as a face, such as faces stamped on a visitor's t-shirt, for example. Having my face captured right in the beginning of the show reminds me about surveillance mechanisms. "But isn't this an exhibition about nanotechnology?" I ask

[6] All images in this part are sketches developed during the process of producing the exhibition. While they are not photo-realistic pictures from the show, they represent the early intentions of artists and scientists involved in its development. Therefore they can be viewed as potential spaces that will be actualized in the final **nano** show.

[7] This is a fictional walk-through of the **nano** exhibition by an imaginary visitor. This description does not intend to cover the entire show, for its richness and complexity exceed the scope of this essay. Elements that belong to the exhibition but have not been mentioned are: *Seeing by Feeling*, *the Mandala Kaleidoscope*, *Virtual Crystal Assembly, Model Assembly*, and the *Lounge Area with Nanofurniture*. This was the status of the exhibition in December 2003. As the exhibit continues to evolve, some of its components may also change.

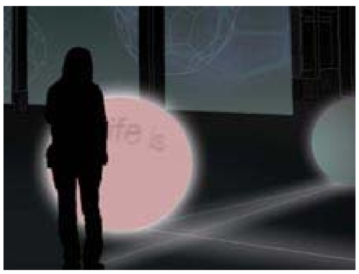
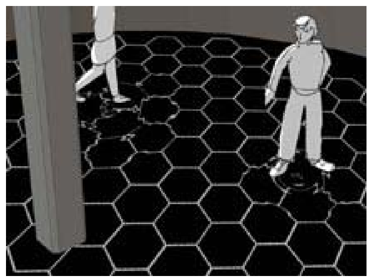
myself. Why are there surveillance cameras at the entrance? How could I forget that one of the anticipated developments of nanotechnology is the ability to invisibly monitor and identify elements of one's identity? Nano, among other things, is about surveillance.

The projection is the first movement interpolating the participant inside the nanospace. The animation of these "molecules" reminds me of the self-assembly mechanisms that many researchers expect will be used in nanotechnology. In the projection, each hexagon attempts to align with or attach itself to others, and groups combine into larger (and slower) moving aggregations. The hexagonal "molecules" with faces in them, resembling graphite, begin to shrink as new molecules are formed with other visitors' faces inside them. I feel as if my face is smaller than a protein. Nano is also about scale.

Picture 37: *Sense space*.

(2) Sense space. Now I am crossing a dark tunnel. I can barely see, but rumbling sounds, echoing spoken words, and the walls' texture transform the environment into a different kind of sensory space, in which I must use senses other than vision in order to perceive. Suddenly my idea of what is stable and physical is endangered, because I always thought the most accurate way of perceiving the world was by seeing. The dark atmosphere in the *Sense space* reminds me of many imaginary nightmares commonly associated with nanotechnology, such as invisible nano-bots that invade the human body to destroy it, mind control through invisible mechanisms, and molecular structures

imperceptibly injected into the brain to manipulate people's dreams. I wish to leave this space. Following the sounds and sensing the walls, I recall reading that the nanoworld cannot be viewed, only sensed with the tip of a scanning tunneling microscope (STM) that registers the topography of an atomic surface, an activity more like feeling than seeing. Then I think about how it would be if I were one of the atoms being probed by the STM, as the *Sense space* flows into the *Inner cell* of the exhibition.


Pictures 38, 39 and 40: *Inner cell*, hexagonal floor projection and *Robotic spheres*.

(3) <u>*Inner cell*</u>. Walking further through the tunneling *Sense space,* I reach a circular cell. Cells are the cores of any living organisms,[8] and a cell space is also the core of **nano**. The rumbling sounds I heard before are coming from there. A projection can be viewed on the wall, and a different one on the floor; people are walking through the environment; and four big spheres are rolling across the space. While I walk slowly in order to sense the cell, I realize that I also affect the projected pattern on the floor. My steps have the power to deform a glowing hexagonal grid, similar to a pattern of graphite molecules. The deformation is a wave-like movement, transforming the static floor into a moving light pattern. The reactive floor also triggers bass frequencies while I walk, mimicking wave behavior on a molecular scale. It is as if I could hear the sound of an atom. Waves created by my movement over the floor merge with waves produced by other visitors walking around, as well as by deformations induced by the strange spheres. They are *Robotic spheres,* automatically rolling over the floor apparently without the need of human aid. Spherical shapes allude to atomic forms. Being able to touch these 3-foot-tall plastic spheres, rolling like giant atoms, makes me feel closer to the nanoworld. Then I think, for the first time, that the environment around me and also myself are not

[8] The exceptions are viruses.

only constructed by what I am able to see with my bare eyes. The glowing grid is also projected on top of the robotic "atoms," creating a three-dimensional curved surface. Everything is connected in this environment, like a propagating wave influencing all nearby elements.

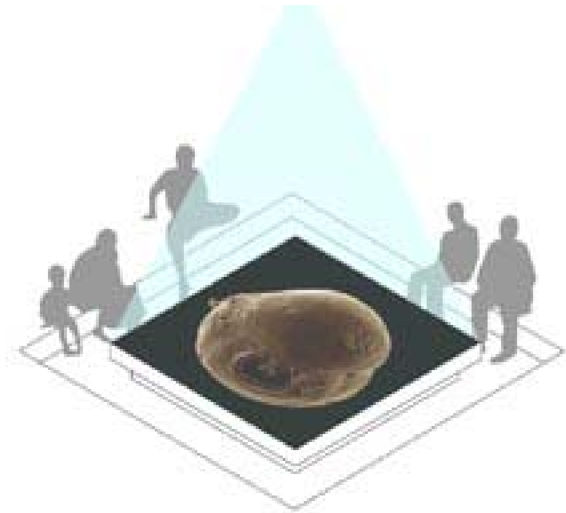
Raising my head, I perceive a huge projection of cellular-like structures resembling buckminsterfullerene carbon-60 molecules, or buckyballs.[9] Participants' shadows are projected onto the same wall, sharing the virtual nanospace with the buckyballs. From time to time a new molecule grows on the wall, while some stand still. I realize that my shadow is able to move and deform these structures. However, not every movement affects the system. Abrupt and fast gestures are helpless.

Picture 41: *Atomic manipulation space*.

(4) *Atomic manipulation apace*. I exit the *Inner cell* via another *Sense Space* and realize that these spaces function to connect the *Inner cell* to the outside environment. I reach the *Atomic manipulation space*, which consists of a nine-sided table with a projection on top and four track balls on its side. Getting closer, I perceive that the projection reproduces a bird's eye view of the same space I have been in before: the *Robotic spheres* and visitors walking across the cell. Moving one of the track balls, I realize that they are interfaces used to control the *Robotic spheres* in the *Inner cell*, allowing me to be present in the former room, although not physically. If, as I thought

[9] The installation is based on Zero@wavefunction: nanodreams and nightmares, the first collaboration between artist Victoria Vesna and scientist James Gimzewski. <http://notime.arts.ucla.edu/zerowave> (Jan. 18, 2004)

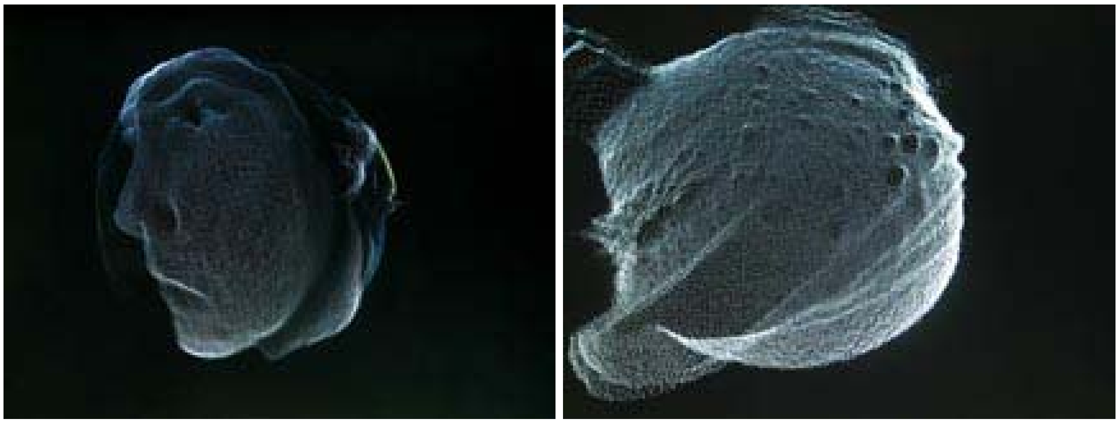
earlier, the *Robotic spheres* are atoms, my manipulation here resembles the manipulation of atoms through the STM.



Picture 42: *Nanomandala*.

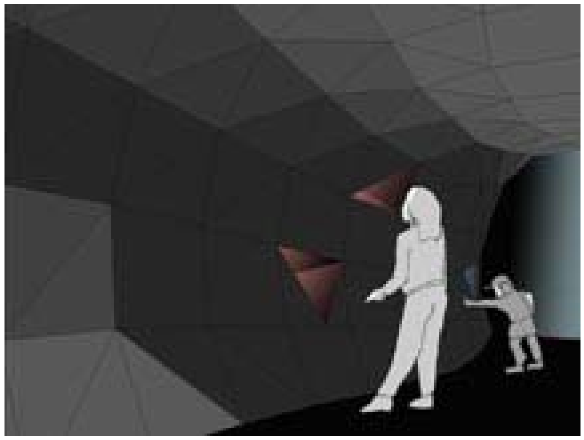
(5) <u>*Nanomandala*</u>. Exploring the space outside the cell, I find a dark room composed of a sand surface in the middle. Entering the space, I activate a projection over the sand, which has images of sand across a wide range of different scales, from visible sand grains to the invisible atomic structure. The transformation from sand to atom is inspired by the sand mandala created by Tibetan Buddhist monks for the **Circle of Bliss** exhibit in LACMA East. I knew that the word mandala comes from Sanskrit and can be loosely translated as “circle,” “whole,” or “zero.” A mandala can be regarded as a model for the organizational structure of life itself, and there are many types of mandalas. The sand mandala exemplifies the impermanence of life and may take many days to be constructed. It is originally composed of colored sand made out of crushed semiprecious stones. These millions of grains of sand are painstakingly placed on a flat platform and, after a period of days or weeks, are swept up into a jar and poured into a nearby water course to demonstrate the cycle of life. In dealing with atoms and cells, **nano** also deals with the organization of living structures. The exhibition thus uses the *Nanomandala* to suggest a connection between two distinct processes of building the world from the bottom up. While monks manipulate grains of sand as models for the organization

structure of life, nanoscientists manipulate atoms, as the smaller known structures that construct the world.



Pictures 43 and 44: *Quantum tunnel*.

(6) *Quantum tunnel*. Walking farther, I enter a dark environment with a mirrored floor. A camera stands on the top of a long and flexible metal structure. Grabbing the camera, I see that the static image projected on the wall in front of me starts moving. My image, converted into “particle clouds,” begins to be graphically disturbed and altered. Looking back, I see that the movement of children running across a white tunnel has influenced my image. The mirrored floor over which they run reflects the actual environment, creating a double sense of space. I don’t exactly understand what is going on, but text on the wall outside explains that this part of the exhibit shows information being exchanged between two visitors standing at either end of the quantum tunnel, similar to electrons “tunneling” through an energy barrier because of quantum effects. I am curious about this phenomenon and decide to look for a more detailed explanation in the *Resource room* (9) of the exhibition.



Picture 45: Kaleidoscopes.

(7) Looking in from the outside. Going toward the *Resource room*, I find two holes on the outside wall of the *Inner Cell*, a lower one and a higher one. I am compelled to look, as the orifices radiate colorful bright lights, and discover a giant kaleidoscopic structure embedded among the wall panels. Looking through the higher one, I see the *Inner cell* in a kaleidoscopic view. Besides the fracturing view of multiple perspectives, I hear narratives that sound like science fiction: “He’s always wanted to become quantum dust, transcending his body mass ... live outside the given limits in a chip, on a disk, as data, in whirl, in radiant spin, a consciousness saved from the void” (Delillo, 2003, p. 206).

(8) Text. A black-and-white particle cloud is projected on the outside wall of the *Inner Cell* adjacent to the kaleidoscopes. Walking in front of the projection I see that my movement across the space has the power to destabilize the particles. After the perturbation ceases, they reassemble into a phrase related to nanotechnology. Every time a visitor comes, he or she disturbs the text on the wall, making the particles rearrange into another different phrase. The dispersion of the image on the wall, like a swarm of particles, reminds me of Michael Crichton’s passage in Prey: “A human body is actually a giant swarm. Or more precisely, it’s a swarm of swarms, because each organ—blood, liver, kidneys—is a separate swarm. What we refer to as a body is really the combination of all these organ swarms” (Crichton, 2002, p. 260).

At this point I am adjacent to the *Resource room* (9), where books and other research material can be found on the tables. From this perspective, I look back on the exhibition space and notice the flowing lines of the architectural structures. I glance at a pedestal on which sits a leaded glass triangular model created by Buckminster Fuller and realize the same forms are used on the walls of the cells and modules. The model represents Fuller's Dymaxion Map, the only flat map showing the entire Earth surface without distorting the shape of the land areas and without splitting the continents. The idea of connection among parts, turning them into only one structure, is present in the **nano** architecture, suggested by the flow from one space to another. Now I understand they are all simulations of a nanoworld where boundaries are fluid and solid objects melt with molecular motion. I start appreciating that everything around me is in fact made out of atoms, including my own body and brain.

8.2.2. **nano** and LACMALab: changing the concept of museum spaces

Metaphorically injecting visitors into the invisible nanospace, **nano** challenges the traditional concept of what a museum means through three interconnected actions: (1) enlarging what is supposed to be invisible; (2) mixing virtual and physical spaces; and (3) exploring the borderland between the real and the imaginary. These challenges, implied by the main exhibition pieces as well as by the exhibition space itself, are consistent with the main goals of LACMALab's Director, Robert Sain. LACMALab focuses on creating a new museum space that appeals to people of all ages, commissioning artists to create exhibits and construct a participatory space.

nano is the fourth long-term exhibition developed by LACMALab, a research development unit of the Los Angeles County Museum of Art (LACMA). According to Robert Sain, "LACMALab is a new initiative designed to develop, test, and apply experimental approaches to engage the public—particularly children, teens, college students, parents, and seniors—with the museum's permanent collection and exhibitions."[10] The first show, **Made in California: NOW** opened in September 2000 and was up for ten months. Eleven California artists were commissioned to create interactive installations specifically to engage children and their families. The second exhibition, **Seeing**, lasted from November 2001 to September 2002. For this show,

[10] SAIN, Robert. **Catálogo Geral do LACMALab**.

LACMALab commissioned nine Los Angeles-based artists with three broad challenging guidelines: Works should explore the concept of "seeing"; they should incorporate at least one object from LACMA's permanent collection; and they should appeal equally to children and adults. **Making**, up from November 2002 to September 2003, comprised installations from four major art schools in Los Angeles: Art Center College of Design, California Institute of the Arts, Otis College of Art and Design, and the School of the Arts and Architecture at UCLA. Teams of student and faculty artists and designers were asked to create participatory pieces that investigate the process of making art.

For the first time, **nano** creates an overall concept for the whole space. The UCLA team, including media artists and nano-scientists led by artist Victoria Vesna and scientist Jim Gimzewski, together with writers led by N. Katherine Hayles involved in the production of the text passages in the exhibition space and a book, created the exhibit with the goal of producing a unified artwork that would suggest the participation of everything, including visitors, in the nanoworld, the space where the world's composition becomes apparent. In order to inject visitors inside the nanospace, the installations filling the exhibition deal with concepts such as *scale, surveillance, boundaries, identity, seeing by feeling,* and *mapping invisible spaces*. The interconnections among science, technology, art, and the humanities are expressed through architecture and installations that merge virtual and physical spaces, transforming the exhibition environment into a hybrid space, a mix of real and imaginary realms.

LACMALab's initiative reflects a general tendency among the arts and museum fields toward interactivity. It rethinks museum spaces in order to better integrate them with media arts. In contrast to a conventional museum experience, it is no longer only the visitor who is changed by the space; the space is also modified by the visitor. **nano** is representative of initiatives by museums to incorporate media arts into their spaces, thus changing the relationship between museum and audience.

8.2.3. The construction of museum spaces

8.2.3.1. The physical museum

We can better appreciate the hybridization of contemporary museum spaces by looking back at how traditional modern museums were organized. Modern European and North American museums can trace their origins back to the 17th century, with the opening of The Ashmolean Museum in Oxford in 1683. The concept of a traditional museum developed as a place that encompassed a collection of artifacts of several types. These collections had their origins in medieval and Renaissance collections of wonders and rare objects, which belonged to private collectors and later were donated to public museums. According to Foucault (1994, p. 364), traditional museum spaces can be regarded as heterotopias, since they are spaces that juxtapose in a single physical place several virtual (non-present, but existent) places.[11] Therefore the concept of *virtual* is already contained in the idea of a museum. Similar to libraries, which are collections of books from all places and times, museums are heterochronies or heterotopias of time (*Ibid.,* p. 367). Consequently traditional museums, embedding within themselves their origins as a collection of objects from different times and places, include the seed of the virtual. Hybrid museums accentuate and develop this implication by positioning the virtual in a dynamic relationship to the actual rather than as something outside of physical space.

Because their artifacts were supposed to be admired, museums developed as impersonal, neutral, and silent environments. The white cube was meant to create an isolated room disconnected from every aspect of outside physical space. The expectation was that museum visitors would be able to appreciate the artwork in a pure way, without any influence from outside reality. Reality was to be created by each individual object, which was in turn related to other virtual places. Traditional paintings and art objects were supposed to inhabit their own reality, which were not to be mixed with any other outside context.

To achieve this state, a certain distance between the viewer and the viewed object was required: no touching, no photography, no loud talking. Walking through museum

[11] For a more detailed explanation see chapter 2, **Defining Virtual**, “virtual as a non-place.”

galleries, visitors created their own narratives that were not generally shared with other visitors. Moreover, the white cube was unchangeable. Granted that the perception of the room may change depending on what size paintings were hung on the wall and how art objects were placed in the environment, there was nevertheless no direct interaction between visitors and museum rooms. There was also no connection between visitors' movement and the shape of galleries, that is, the museum space was unaffected by the presence of visitors.

8.2.3.2. The virtual museum

The emergence of the World Wide Web in the 1990s encouraged the utopian desire of creating an ideal museum: one that someone could visit without being physically present. The virtual museum represented constant access to artworks from any point with an Internet connection. The traditional unchanging museum space contributed to the easy transference of museums from physical to digital spaces. As the physical space that surrounded the artworks was not part of the exhibitions, why not eliminate it? This thought led to the great misconception of the past decade, when digital spaces were in some instances regarded as replacements for physical environments. Digital cities were designed in order to create new types of sociability on the Web, enabling users to make virtual avatars and develop new social connections. As a result, Web sites were viewed as remote places that could be instantly accessed from any server in the world. The user was therefore no longer required to dislocate through physical space in order to reach distant locations and to access information. Why go to a specific place if one can have everything via the Web?

According to William Mitchell, (1999, p. 59) virtual museums have advantages over physical museums because "the exhibit material is kept on servers on a network, and viewers can be scattered at remote locations. It is not gallery capacity that matters, but server capability and network bandwidth." Does accessing "information" about a museum replace the actual feeling of being inside a museum? Not really, for sure, but defenders of virtual museums also argued that they could offer far more choices for exploration than a large-scale traditional museum. Although virtual museums would never mean the extinction of traditional museums, Mitchell (*Ibid*., p. 60) suggests that "as virtual museums develop, the role of actual museums will shift; they will increasingly be seen as places for going back to the originals." As a result, one would see the work of art online, but one would go to a museum to see the original piece. Following the argument of Walter Benjamin's "The work of art in the age of mechanical reproduction" (1990), the physical museum would be the place in which works would still have the aura of the original, and that is why they would remain significant.

Nevertheless, if museums were there merely to display the original object and if the majority of visitors did not care whether they saw the collection personally, changing viewing practices might arise that implicitly regarded an art object as representing only a specific amount of information. In this case, it would not matter which support was used to access the information: a Web browser or a wood canvas. According to Claude Shannon's (Hayles, 1999, p. 54) definition, information is an immaterial entity that remains constant independent of the material substrate used to carry it. Considering that the concept of cyberspace has been based on the development of an information space, virtual museums have sometimes been viewed simply as information databases that can accumulate much more than the physical museum. In practice, however, a brief survey of museum Web sites shows that they are mostly constructed in order to support physical museums. They are useful to check a museum's opening hours, or selected content of permanent collections and special exhibitions, but to date they have not begun to replace the traditional museum.

In contrast, Roberta Buiani (2003, p. 7) points to a few Web initiatives that aim to create "real" virtual museums, that is, virtual places that have no original in the physical world and are not intended to supplement, or simulate, a traditional museum. Examples include the Walker Art Center section on Net art (Gallery 9),[12] and the Uruguayan museum El Pais.[13] While the first one focuses on Net projects designed and conceived to be viewed solely online, the second example contains pictures of real painting and sculptures that belong to private collections. Both share the characteristic of displaying artworks that could not be contemplated by the common public in the physical world.

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[12] WAC | New Media Initiatives | Gallery 9. Available at: http://www.walkerart.org/gallery9/. Accessed on: 18 Jan. 2004.

[13] Museo virtual de artes el pais. Available at: http://www.elpais.com.uy/muva2/. Accessed on: 18 Jan. 2004.

Another singular example is the Virtual Museum of Canada,[14] "which unifies under a single roof the resources of all Canadian museums" *(Id.,* p. 8). In this sense it could be defined as a heterotopia of a heterotopia, since traditional museums are already heterotopias. The VMC is a Web site about Canadian culture, and although much of its content can in fact be found in physical museums, there is no single physical place in which the VMC would be contained. These last three examples differentiate substantially virtual and physical museums, emphasizing that although they can be complementary, they may also have completely different purposes. There are Web pieces created to be viewed online and, in this case, there is no point in showing them in a physical museum. By contrast, there is always a degradation of experience when seeing a traditional painting on the Web, and that is why Web sites of traditional art objects would never replace physical collections. Paintings acquire totally different meanings when looked at closely. The effect of light on canvas, the perception of brush strokes, and many other characteristics require the observer's physical presence for full appreciation.

Hence virtual museums can be divided in two types. One complements physical museums and is meant as a guide to their collections. The second type does not have a direct link with a physical building and provides the public with artworks that, because they are dispersed in different locations or are on-line creations, do not require or could not be exhibited in a single physical environment.

Even after the emergence of virtual museums, the function of museum spaces remained largely traditional. They still consisted of impersonal, neutral, and quiet spaces. Nonetheless, with media arts, questions about the museum's function and structure started to grow. The hypertext structure of the Web directed people's attention to more flexible ways of constructing narratives throughout the museum. Also, the emergence of online multiuser environments showed that an interactive and ever-changing space could enhance communication among users/visitors. These developments catalyzed a new kind of approach: "Could this ever-changing virtual space be brought into a physical 3D environment?"

[14] Virtual Museum of Canada—Musée virtuel du Canada. Available at: http://www.virtualmuseum.ca/. Accessed on: 18 Jan. 2004.

8.2.3.3. The hybrid museum

The attempt to adapt museum spaces to show Web art during the past decade was a challenge to most traditional museums. How to deal with projections and black boxes instead of white cubes? How to connect remote virtual environments to the actual space? With the development of media arts, new challenges were inevitable and many museums wondered how to adapt their spaces to deal with this new type of art.

Unlike virtual museums, here the challenge arises from new interfaces used inside (or outside) the public space of a museum, in contrast to accessing a museum at a remote distance. Nomadic technologies and smaller interfaces, as well as real-time cameras and sensors, are being used by artists to convey their message in ways no longer compatible with the separation of the visitor from the exhibition space. Art pieces are popping out from the 2-D flat wall to inhabit a 3D space that is, moreover, changed by the visitor's actions, making it unlike sculpture and the plastic arts. Also, this space is no longer disconnected from outside reality; rather, it brings the visitor (now called participant) into the artwork, creating new kinds of participatory spaces.

Considering that virtual museums did not replace traditional museums, it is probably true that media art museums will not do that either. Traditional museums will most likely remain established places constructed to show conventional art, such as paintings and sculptures. Nevertheless, the emergence of new forms of art that employ mobile and pervasive digital interfaces demand the creation of new types of museum spaces for those institutions interested in adding them to their collections. I shall call these new types of institutions hybrid museums. Hybrid museums have two main characteristics: (1) they merge the borders of physical and virtual spaces by means of the visitor's presence and mobility; and (2) they promote direct interaction and communication among visitors and between visitors and the museum space.

According to Lev Manovich (2002, p. 11), "one trajectory which can be traced in the twentieth century art is from a two dimensional object placed on a wall toward the use of the whole 3D space of a gallery." However, he stresses that "this trajectory is not a linear development; rather, it consists from steps forward and steps back." The creation of three-dimensional interactive installations dates back at least to the 1960s, especially in neo-concrete art. Brazilian artist Hélio Oiticica was among those who began to experiment with interactive installations, anticipating moving art off the canvas into the realm of life. By the mid-1960s, Oiticica had abandoned traditional painting and sculpture in favor of freeform constructions *("Parangolés"),* such as banners and capes meant to be worn or inhabited. Although his works did not employ electronic technology, they represented an important step toward reconfiguring the art object/viewer relationship. "Beginning in the 1970s," writes Manovich (*Ibid.,* p. 11-12), "installation grows in importance to become in the 1980s the most common form of artistic practice of our times ... Finally the white cube becomes a *cube*—rather than just a collection of surfaces." Accepting that information is never independent of the material interfaces that transmit it, we could argue that the present condition differs from previous installations in the merging of virtual and physical spaces, a development hastened by nomadic interfaces and pervasive computing made possible by the increasing miniaturization of intelligent hardware.

Artistic practices, as well as traditional museum spaces, have been affected by these new technologies. Many initiatives use nomadic and wearable interfaces in order to change the experience of walking through a museum. Flavia Sparacino's **Museum Wearable** (MIT) consists of a wearable computer that functions as a museum interactive guide. The **Museum Wearable** is an interface carried by the visitor, composed of an audio system and a "private eye" that personalizes the museum visit. For example, if the visitor spends a long time in front of a specific painting, the system delivers audiovisual information about that work. Therefore the guide is configured differently for each visitor. According to Sparacino (2002, p. 2), the goal of the project is to create "a system which can be personalized to be able to dynamically create and update paths through a large database of content and deliver to the user in real time during the visit all the information he/she desires." This project follows the tendency of major Internet content during the 1990s to create private spaces inside public spaces. Web sites such as amazon.com generate personalized information for different types of users. Similarly, chat rooms and personal messaging further increased the sense of personal spaces inside the Web space. Although these technologies changed the museum space to some extent, they did not transform the fundamental meaning of what a museum could be.

In contrast, new media arts, transforming neutral spaces into participatory environments, change the meaning of the space itself from a silent place to an actively experiential communication environment. In this context, the concept of the *virtual* as it relates to a museum no longer means merely a Web site that can be accessed remotely. A different sense of the virtual is constructed as a potentiality that can be actualized. In a museum context, these virtualities are actualized by visitor's actions in physical spaces. Virtualities are potentialities always ready to emerge and to reconfigure the reality in which they appear.

Hybrid spaces bring communication places again into urban public spaces, redefining imaginary spaces formerly projected onto digital spaces. **nano** combines real and imaginary spaces, representing the world of nanotechnology through art and science fiction. The exhibition not only blurs the borders between what is real and what can be imagined; it also redefines imaginary spaces by changing their traditional location.

8.2.4. The construction of imaginary spaces: **nano**

Nowadays, we can perceive a migration from cyberspace to nanotechnology, as authors become interested in representing the really small. In such works as Neal Stephenson's **The Diamond Age** (1995) and Michael Crichton's **Prey** (2002), nanotechnology becomes a territory waiting to be explored, albeit within known and inhabited spaces. Not coincidentally, both these works associate nanotechnology with the exploration of mysterious spaces at the margins of cities or densely populated areas; for **Prey** it is a nearly uninhabited desert, and for **The Diamond Age** the underwater realm of the Drummers.

The fact that these marginal spaces are associated with nanotechnology indicates that there is a possibility of creating the unknown even within the known. It is no longer necessary to travel to strange lands or to go into cyberspace to find the unknown; it is folded within the known objects and spaces we inhabit in our everyday lives. Nano particles, generally not well understood by the general populace, are invisible, even to scientists. One of the mechanisms to "visualize" atoms is the scanning tunneling microscope (STM). In the STM's operation, a tunneling current flows when a sharp tip approaches a conducting surface of atoms at a distance of approximately one nanometer. The tip movement over the atoms and molecules is recorded and the data can be used to construct an image of the surface topography. At constant current flow, each individual atom on a surface can be resolved and displayed. Metaphorically, it is like a blind person who only knows the world by feeling its surface and can therefore imagine how surfaces would appear.

Interestingly, attempts to actually *see* atoms through the Transmission Electron Microscope (TEM) sometimes fail because some molecules cannot support the high energy levels that come from the microscope's electrons, "burning" the molecules. The TEM works much like a light microscope. However, the difference is the source of illumination: Whereas the light microscope uses a beam of light, the electron microscope uses a beam of electrons to illuminate the sample. The wavelength of electrons, which is much smaller than the wavelength of visible light, sometimes destroys the tiny particles it attempts to illuminate, depending on their resistance.

Because nanotechnology is quite new and not generally understood, it has become an important source for the projection of the imaginary. Humans have always had a difficult time trying to understand what appears not to follow the "normal" course of nature,[15] as well as what is not visible. Nanosciences encompass both, since in the nano world particles are not visible to the human eye and behave differently than large-scaled matter. **nano** (the exhibit) speaks to our desire to know imaginary spaces by representing molecular patterns and mapping the invisible using sounds and graphics.

The creative team working at LACMALab on the **nano** exhibit created hybrid spaces, that would reveal the interplay between actual and virtual realities. At subatomic levels, particles pop in and out of existence, surface boundaries are dynamically unstable, and the observer affects what is observed. **nano** takes advantage of art mediated by technology to represent the universe of potentialities discovered and explored by nanosciences. Connecting nanotechnology to imagination does not imply that the science itself is imaginary; rather, it is related to how people project their imaginaries onto a potential and unexplored part of the real.

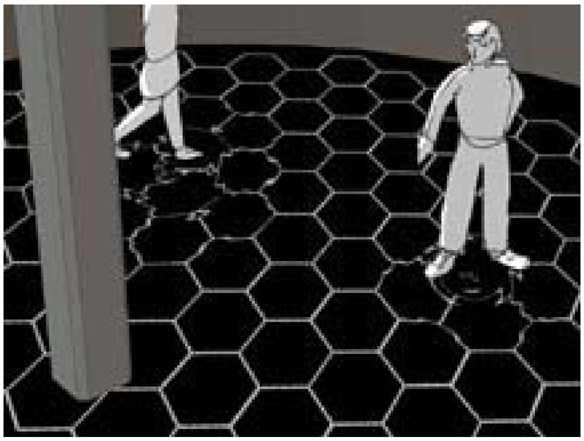
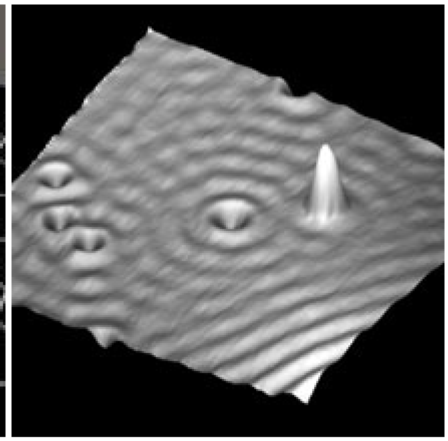
[15] We saw in chapter 3 that beasts and weird races belonged to this category in the Middle Ages.

nano creates a hybrid reality by allowing remote visitors to use physical avatars *(Robotic spheres),* merging physical architecture with projections that represent "invisible" realms *(floor projection grid),* and treating human beings as quantum particles that interfere in non-contiguous spaces *(Quantum tunnel).* Most of all, it creates a hybrid reality because it merges potential and actual spaces.

The hybrid space starts to configure as soon the visitor enters the exhibition. The placement of the visitor's picture inside a projection on the wall, mixed with other faces that have been in the exhibition before but are absent now, is the first sign of hybridization. The mixing of virtuality and actuality is strengthened by text passages on the wall. "You are the sum total of your data"(Delillo, 2003b, p. 141), a text passage close to the camera swarm that took the picture, asserts that human organisms are "digital/genetic" data.

Sense spaces invite the visitor into the invisible realm of nanotechnology by creating an immersive sensation that is mainly evoked by audible and tactile experiences. Tactile spaces are also part of the nomad art (Deleuze; Guattari, 1997, p. 492). According to Andrew Pelling, a nanoscientist graduate student co-responsible for the sound, **nano** aims to make sound itself a tactile experience. Part of Pelling's research focuses on converting the ASCII data obtained from oscillatory (beating) movement of cells sensed with the Atomic Force Microscope (AFM) into sounds. Nanobots (nano-sized robots) are often envisioned as armies of microscopic machines. Similarly, inside a cell millions of proteins are "swarming" to make things happen. Therefore, in the *Sense spaces* small sound bits and words come together and swarm, contrasting with large moments of silence and "background" noise.

The *Inner cell* works with sound in a similar way. Sub-woofers are used to make the visitor feel the bass associated with the floor, so that the floor surface pulses and responds to movement by people and *Robotic spheres* in its space. The floor projection, an analogy to nano-space, is composed of a hexagonal grid representing a hexagonal pattern of graphite carbon atoms. In the nanoworld every particle influences each other, so the space is deformed by the presence of other particles, in this case visitors and *Robotic spheres*. The floor has a wave-like behavior, similar to what happens in the nanoworld. The wave-like behaviors revealed by the visualizations produced by the data collected via the STM are caused by electrons, which can behave like waves as well as particles. Therefore they are dispersed in space, and this nano-dispersion is represented similar to an ocean. Every nano particle that comes close enough to an atomic surface affects it and is affected by it. Causing perturbations in the floor projection, visitors are like atoms experiencing quantum mechanical interactions.

Pictures 46 and 47: The graphite floor and
the scanning of graphite atoms with a STM.

The *Inner cell* also mixes the actual architectural space with potential representations of cellular movements. The interaction with the Buckyball projection includes a double sense of the virtual. Molecular structures resembling the buckminsterfullerene C-60 carbon molecule appear on the virtual space of the wall, and visitors can manipulate the molecules with their shadows. The piece acquires meaning through interaction with visitors. The molecules can be moved and squeezed in different ways, creating interactions in which visitors and atoms mutually influence each other.

The C-60 molecule represented by the piece was discovered in 1985 in an experiment to unravel the carbon chemistry in red giant stars. Until then, carbon was known in the form of diamonds and graphite. Whereas a diamond has a modified tetrahedral structure, graphite forms a flat grid composed of hexagons. In contrast, the buckminsterfullerene carbon atoms are connected with a slight angle in between, creating a closed cage structure that resembles a soccer ball formed by 12 pentagons and 20 hexagons. The deformation of the Buckyballs in the piece is similar to what happens when an STM pushes the C-60 molecule using electrons that come from the microscopic tip. Electrons flow gently through the tip, and if this flow is monitored, it is possible to see the deformations created by the tip literally "poking" the Buckyball. In the projection, the visitor's shadow works as a tip that can deform and move a Buckyball. However, only slow and smooth movements can move the molecules, indicating that fast and rough movements are not (yet) effective at the atomic level while manipulating atoms. In playing with scale, the piece aims to make people aware of how atoms and molecules behave at this invisible level of reality.

Finally, the *Inner cell* is inhabited by *Robotic spheres*. Representing giant atoms, these spheres embody virtual participants, inverting the traditional meaning of a digital avatar. The Hindu word *avatar*, widely used among the digital community, designates a being who is the embodiment of the god Vishnu. In digital parlance, when one chooses a virtual character to represent oneself, this "creature" becomes one's avatar, so that an avatar is a digital representation of a physical body. In the case of *Robotic spheres* this relation is inverted, since the *spheres* have actual existence that respond to actions of individuals who are not physically present in the *Inner cell*. The initial idea behind the *Robotic spheres* was to create a remote Web site through which they could be controlled. Later, the control interfaces moved to the *Atomic manipulation space*, allowing participants in that exhibit module to interact with the adjacent *Inner cell* module. In both cases the idea is to combine remote and contiguous spaces into a hybrid environment and also to have visitors interacting with physical avatars. Manipulating the *spheres* also affects the visitors in the *Inner cell*, because they feel compelled to move whenever a *Robotic sphere* approaches. In this sense, visitors also have the power to manipulate and affect other visitors in the exhibition. The remote manipulation of the *spheres* has been inspired by the work of Donald Eigler and Erhard Schweizer who in 1989 spelled out *IBM* by individually arranging 35 xenon atoms onto a nickel surface with an STM. The ability to remotely influence and rearrange the *spheres* represents the idea behind (the imaginary of) nanotechnology in building matter from the bottom-up.

The same thought is represented in the *Nanomandala*. The installation deals with the process of constructing our universe by connecting grains of sand as a metaphor for the basic structure of life to atoms as the building blocks of our universe. The

Nanomandala also connects LACMA East, the traditional part of the museum where the original mandala constructed by the monks is exhibited, to LACMALab, since it projects over the sand the original work in the adjacent museum. Following the purpose of traditional museums, visitors are not able to interact with or to touch the mandala exhibited in LACMA East. Conversely, the *Nanomandala* is designed to invite interaction, encouraging visitors to play with the sand, highlighting one of the characteristics of hybrid museums.

Hybrid spaces can also be understood as a dynamic enfolding of different contexts and scale levels into one another, via digital technology. Kaleidoscopic structures spread throughout the exhibition contribute to folding the space inside itself. When the visitor moves around **nano**, he or she is able to look at distorted views of the *Inner cell* while being immersed in a soundscape of fictional narratives about nanoscience. The *Kaleidoscopes* play with the idea of looking *in* from the *outside*, creating an interplay between inner and outer spaces.

Lastly the *Quantum tunnel,* like other parts of the exhibit, is based on the idea of potentiality and possibility. Quantum tunneling is described by quantum mechanics as the probability that an electron, when encountering an energy barrier, goes through it instead of bouncing back. There is a finite probability this could happen with large-scale entities like human beings, although here the probability is so infinitesimal that it would not happen once during the lifetime of the universe. The *Quantum tunnel* addresses human beings as if they were electrons tunneling from one space to another, capable of altering other people's particles.

The distinction between the actual and virtual blurs in the nanoworld, since electrons have no precise physical location, can behave like particles or waves, and can apparently "jump" from one point to another without moving through the intervening space. Nano particles are simultaneously potential and actual entities, revealing the merging of these states into a hybrid reality. How can anything be considered as strictly *either* potential *or* actual in the nanoworld?

8.2.5. Blurring borders between real and imagination: potential futures

The blurring of potentiality and actuality in the nanoworld and the lack of general knowledge about nanotechnology, create a fertile imaginary around the new discipline. A common nightmare speculates that, with the aid of nanotechnology, researchers will build nanostructures capable of replicating themselves like nano-robots. UCLA Professor James Gimzewski (18 Jan. 2002), co-responsible for **nano**, relates that when he worked at IBM "a newspaper called the **Bild** printed a front page story saying 'IBM creates nanobots that can cure cancer' with a picture of them swimming inside the human body and describing it as having a cancer-killing unit that used lasers to 'blast away' the cancer cells." Immediately, there were people from all over the world calling IBM and asking how to get these nano-bots.

The nano-bot story was not true, but there are many future possible developments for nanotechnology that might have a great impact on our future. Several possible inventions aim to develop biochemical sensors responsive to the environment. For example, windows can cool the ambient air if it is too warm outside, and clothes can warm the wearer if it is cold or cool one down if it is warm. Another application envisioned by Gimzewski *(Id.)* is the use of biodetectors in restaurants "and in any public place, which can be used by uneducated people and that will detect the presence of viruses and different types of hazardous material." Nanotechnology can also be used to engineer intelligent drug release systems and to manipulate cell structures inside the human body. This idea has been explored by science fiction for some time. For example, the 1985 movie **Innerspace** (Dante, 1987) narrates the story of a group of people who are miniaturized and injected inside the body of a hypochondriac. Most of the dreams and nightmares related to nanotechnology are connected to the creation of nanostructures and molecular machines that could go inside the human body in order to fix or destroy it.[16] Other favorite science-fiction themes include the creation of pervasive surveillance and invasive devices that could be injected inside the body. What if somebody could control a person's dreams without any visible interface?

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[16] For more dreams and nightmares, visit Zero@wavefunction Web site at http://notime.arts.ucla.edu/zerowave. (19 Jan. 2004).

Mark Weiser[17] (Weiser; Brown, 21 Dec. 1985), as shown in chapter 6, used to say in the last decade that ubiquitous interfaces could be considered "natural" because their existence would not be perceived. The smaller the interface, the more "natural" it is. With nanotechnology some interfaces are no longer perceivable by the human eye, and so will "naturally" become an accepted part of the environment. In this context, media arts play important roles in making people aware of new technological innovations. Art has always been concerned with representing imaginary worlds, and it has also often pushed the limits of technology to change the physical world around it. Initiatives like the **nano** exhibit, and more broadly the shows commissioned by LACMALab and other such experimental venues, foment this type of discussion, rethinking the role of art and technology, and redefining the borders between real and imaginary spaces. The dialectic now takes place between the actual and the virtual, both of which are participating in constructing our reality. In working with the "in-between" space that connects art and technology, **nano** and LACMALab create a hybrid space that, without being didactic, stimulates creativity and the desire to learn in children and adults alike.

8.2.6. The visitor glances back

From the **Resource Room**, I look at the wall and read in very big letters: "Nature is Imagination."[18] Watching visitors at Boone's Children Gallery, I think that the museum is no longer the same, and neither are our imaginative constructions of the spaces in which we live.

8.3. Hybrid pieces and public spaces

The event that takes place at LACMA is one example of how traditional museums started to rethink their role as museums. Fundamentally, this happens because artworks started to change, and museums felt compelled to follow this transformation. The connection among art, mobile technology, and ubiquitous computing reconfigures the

[17] Weiser, Mark and Brown, John Seely. *Designing Calm Technology*. <http://www.ubiq.com/weiser/calmtech/calmtech.htm> (August 25, 2003).
[18] William Blake, *The Complete Writings of William Blake*, edited by Geoffrey Keynes (London: Oxford University Press, 1966), letter to Dr. Trusler, 23 August 1799, p. 793. The capitalization is Blake's.

relationship between artwork and observer, who is no longer an observer, but a participant. Consequently, it was no longer possible to demand a quiet and silent visitor, because the pieces themselves longed for interaction with the work, and among visitors. Simultaneously, these hybrid spaces started to extrapolate the museum space and to inhabit urban public spaces, transforming the way we relate to the city and to former circulation spaces.

So far I have talked about museum spaces, and art pieces inside museum spaces that transform impersonal spaces into participatory places. However, I have also mentioned that cities are reconfigured as hybrid spaces, and media arts contribute to transform circulation spaces into sociability places.

As far as western thought is concerned, time cannot be reverted and stating that now we valorize *places* again does not mean that urban spaces will revert to looking somehow like they had been before the era of advanced transportation and communication technologies. Conversely, circulation and virtual spaces are now embedded in cities' reality. The inherent meaning of the city has changed.

Instead of transferring communication to virtual spaces (which disregards geographical distances), nomadic technology devices allow long-distance communication while moving through the city space. It is likely that nomadic technologies will not change the geographical shape of cities, as the railroad did in the 19th century, but they will probably change the way we understand cities and the means we navigate through city spaces. Media arts move out from museum spaces, interfering in public spaces, and changing their traditional meaning. Hybrid pieces either reinterpret public spaces and/or use virtual spaces to modify physical spaces, transforming sociability patterns and human interaction in specific areas.

In order to exemplify augmented city spaces, Lev Manovich (*op. cit.,* p. 10) analyzes the work of Canadian artist Janet Cardiff, who became famous for her audio walks since 1991. The artist

> creates her pieces by following a trajectory through some space and narrating an audio track that combines instructions to the user ("go down the stairs;" "look into the window;" go through the door on the right") with narrative fragments, sound effects and other aural data. To experience the piece, the user puts on earphones connected to a CD player, and follows Cardiff's instructions.

Without the use of any sophisticated device or wearable computer, Cardiff develops a piece very similar to Flavia Sparacino's **Museum Wearable**. Although Cardiff has also been commissioned to develop audio walks for museums the singularity of her work stands on the fact that the guided tour happens in urban spaces. By means of words and sounds, the artist overlays another conceptual meaning on physical space, embedding a different context in urban space while the user moves through it. It is almost like the Walkman effect, but this time the walk does not depend only on the user, and it is a product of a certain type of interaction among the participant, the artist, and the environment itself. Cardiff's guided tour would create a hybrid space, except for the fact that the tour, like the Walkman, isolates the user from other people. Therefore, it does not create a social environment. Thinking about cities as circulation spaces, one could think, "Why would people stop while moving through the city, unless something extraordinary happens?" Mexican-Canadian media artist Raphael Lozano-Hemmer's pieces somehow represent this "extraordinary" that interferes in the city space, causing people to stop, and experience public spaces in a different way. Moreover, some of his installations succeed in using virtual space to transform the actual space of the city, thus connecting distant and "virtual" users to passersby.

Lozano-Hemmer creates public installations that change how people behave and perceive public spaces. **Vectorial Elevation (Relational Architecture 4)** consisted of 18 robotic searchlights installed on the top of buildings around Mexico City's Zócalo Square (in its first version in 1999/2000). The lights were controlled remotely via a Web site on the Internet, allowing users to draw different patterns on a 3D model online that were then displayed in physical space. The online participant could view the physical result of her drawing with the aid of three Webcams placed on the square. This project linked digital space with the physical environment in a non-traditional way. Generally, cyberspace is viewed as a place in which users can enter and create new digital worlds, which are not contained in physical spaces. With **Vectorial Elevation**, however, digital space was used to modify a physical plaza. Equally important was the way Mexican citizens reacted to the piece. The Zócalo Plaza was already an important reference point in the city. **Vectorial Elevation** increased its physical impact, since many people went to the plaza at night to observe the light patterns, transforming it into a vivid public space. [19]

The recent **Amodal Suspension (Relational Architecture 8)** (2003) uses searchlights in a public space similar to **Vectorial Elevation**. However, instead of displaying online drawings, the searchlights "catch" still unread SMS sent among users via the Web site or their cell phones. The messages are then encoded into a sequence of flashes and displayed in the sky around the Yamaguchi Center for Arts and Media (YCAM) in Japan. **Amodal Suspension** is virtual in a double sense: First because it connects users who are not physically present; and second because it displays text messages before their actualization. It therefore catches virtual messages in a potential state, before they have been read, and transforms them into a physical entity.

A similar effect on public spaces can be observed with other pieces by Lozano-Hemmer, such as *Body Movies (Relational Architecture 6).* According to the artist description, the piece

> transforms public space with 400 to 1,800 square meters of interactive projections. Thousands of photo portraits taken on the streets of the cities where the project is exhibited are shown using robotically controlled projectors. However, the portraits only appear inside the projected shadows of local passers-by, whose silhouettes measure between 2 to 25 meters high, depending on how far people were from the powerful light sources placed on the floor of the square. (Lozano-Hemmer, 2001)

Although not using Internet, the piece creates a hybrid space by bringing unknown portraits hidden on the wall inside the bodies of the actual interactors. The portraits are just revealed when interactors place themselves in front of the huge spotlights that wash out the portraits, making them visible inside the projected bodies. Also the documentation video of *Body Movies* shows several people going to the place where the piece is projected at night, just to interact with it, and therefore, with other people.[20]

Related initiatives go beyond changing a single physical infrastructure or a single installation in public space. Huge media arts projects may construct an entire art space in order to "revive" city spaces. These art spaces can be considered new types of museums,

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[19] **Vectorial Elevation** won the Golden Nica Prix Ars Electronica in 2000.
[20] Other works from Lozano-Hemmer with reinterpreted urban spaces can be viewed on his Web site at www.lozano-hemmer.com.

designed specifically to accommodate non-traditional art that deals with new digital interfaces. For instance, in the Ruhr area in Germany, old inactive coalmines are being transformed into exhibition spaces for media artists. The exhibition **Connected Cities** (1999)[21] transformed the area into a temporary laboratory in which artists represented the urban industrial situation as an enormous collection of cities connected not only through the usual transportation systems but also increasingly linked through invisible lines of communication such as networks and digital media. In this case, as well as the previous examples, we can observe how embedding digital art into physical spaces can change our relationship to public spaces.

8.3.1 Cell phones, art, and public spaces

Realizing the importance of nomadic technology devices, some artists start to explore the interconnections between cell phones, art, and public spaces. An important indicator that technology is becoming ubiquitous happens when art starts to deal with these devices and push its limits further. Nevertheless, artworks that deal specifically with cell phones are still very hard to find. During a one-year period research (October 2002-2003), 11 interviews were conducted with artists and scholars, but few of them could indicate interesting and innovative work in this area. The following pieces have been identified for three reasons: First because they deal specifically with the technology of the cell phone as an interface, second because they connect nomadic technologies and public spaces, and finally because they are original visions of the device.

8.3.1.1. **Wop Art:** creating content for an embedded medium

Artist Giselle Beiguelman is a pioneer in Brazil working with mobile technologies and remote Internet interventions in public spaces. Beiguelman's piece **Wop Art** (2001) connects WAP technology and Op Art. "How to deal with an art form conceived to be experienced in between, while doing other things?" is what the user reads on the project home page.[22] The artist's aim was to create a paradoxical situation, since the image in

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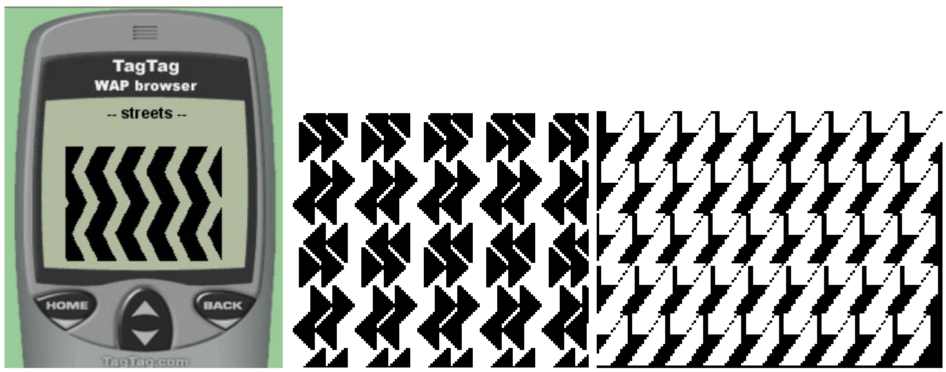
[21] For information, see <http://www.connected-cities.de/>. Accessed on 26 Feb. 2004.
[22] Available at: http://www.desvirtual.com. Accessed on: 26 Feb. 2004.

Optical Art only acquires meaning depending on the viewer degree of concentration and introspection.

According to Beiguelman, the situation was paradoxical not because of the precarious state of the medium back in 2001, but rather due to the incompatibility between what was being offered to read, and the reading context itself. Generally images conceived for mobile devices do not allow contemplation; they are produced to be seen in transit, while moving. Conversely, Op Art requires a static observer in front of the piece.



Pictures 48, 49 and 50: Screensavers for cell phones—streets, difference and exit.

Another interesting aspect of the piece is also related to movement. The Op Art movement was interested in the idea of creating movement on a two-dimensional surface by tricking the eye with a series of optical illusions. Therefore, Beiguelman creates movement on the screen of a mobile device. The work consisted of a series of eight screensavers that could be downloaded to the cell phone via a WAP browser. Each one had a different theme: sea, streets, exit/noexit, crowd, difference, egotrip, wysiwyg or x/z=n, and 2beiCode39. **Wop Art** is a simple example of how cultural content can be disseminated by the use of nomadic technology. A real issue with which content providers should start dealing is how to adapt content for embedded media, or a media that is used "in between."

In Japan, this fact is already banal. There are whole magazines dedicated to the I-mode culture, through which users can choose and download screensavers, games and pictures. Nevertheless, as it has been noted in the last chapter, creating content for WAP browsers is still problematic, since the language is not familiar to the majority of users.

Although the mobile Internet has been viewed with a great expectation in the beginning, the non-success of the WAP browser, especially compared to the I-mode standard, raised a question among mobile phone's context providers: What's going to be the killer application for cell phones?

8.3.1.2. **Social mobiles:** questioning cell phones as social devices

In March 2003, the Agency for Cultural Affairs in Japan promoted the 6th Media Arts Festival in Tokyo. The award-winning work in the category Interactive Digital Art is a peculiar project, more conceptual than aesthetic, that deals with issues related to cell phones as interrupters of social connections. Developed by Crispin Jones and IDEO, a London-based industrial design firm, **Social Mobiles** consists of five cell phone prototypes, each one representing an "annoying characteristic" of the device. For example, SoMo1—the Electric Shock Mobile—delivers a variable level of electric shock depending on how loudly the person at the other end speaks. As a result, the two parts are induced to speak more quietly. Jones goes further and suggests that this type of cell phone is made for people "who persistently disturb others with their intrusive conversations"[23] (Jones, 2002).

Pictures 51 and 52: The Electric Shock Mobile and The Catapult Mobile.

[23] JONES, Crispin; IDEO. **Social Mobiles.** London: Ideo, 2002. Available at: http://www.ideo.com/case_studies/Social_Mobiles/SoMo1-4.html. Accessed on: 20 Sep. 2003.

Similarly, the Speaking Mobile (SoMo2) is a cell phone that makes automatic noises such as “huum,” “ahhah,” “yes,” to be used in places in which cell phone conversations are not welcome, such as museums, or movie theaters. Once the call is received, the phone automatically “talks” to the other part without the need for loud speaking. Jones’s *(Id.)* conclusion: “when two SoMo2 are used, on both sides of a conversation, a new language would emerge.”[24] Another example is the Catapult Mobile (SoMo5). This phone has a little slingshot mechanism, which can be activated pointing to a person who is speaking intrusively on the phone in public spaces. The telephone, then, emits sounds that disturb the conversation, invading their spaces as well.

It is significant that the prize in Japan was given to an art piece whose most important aim is to encourage discussion about the role of cell phones in public spaces. Jones indicates that the “handsets aren’t really solutions; they are interventions” (*Apud* Frauenfelder, 24 Feb. 2003). The artist tested the prototypes on the streets of London, creating interventions in public spaces and raising discussion about public use of cell phones. Matt Hunter from IDEO criticizes mobile phone designers, arguing that manufacturers are only interested in making mobiles smaller in order to make people communicate. However they do not think about the implications of allowing people eo communicate everywhere *(Id.)*. I mentioned the very popular use of cell phones in London public transportation systems, and how citizens are mostly annoyed by the impolite use of mobiles. Although I believe that the role of cell phones as communication devices is changing, works like Jones’s are important to make people aware of the (good and bad) consequences of the use of a technology that becomes ubiquitous. Jones’s work focused mostly on the speaking part of the cell phone, which today in most countries is the least used portion of the phone. Indeed, as has been shown, countries like Finland (and also the UK) found other ways to use their cell phones, thus not disturbing public environments, by means of SMS, Internet, and games.

The enfolding of distant contexts into the present context is not always welcomed, especially in public spaces. Although people may not mind the inclusion of other’s private lives in a public context, as was the case of the teacher in chapter 6, one-to-one

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[24] *Id.* Available at: http://www.ideo.com/case_studies/Social_Mobiles/SoMo2-4.html. Accessed on: 21 Jan. 2004.

use of cell phones do not create multiuser environments. Consequently, they do not change sociability standards already created with the traditional telephone. Mobile phones really change sociability in public spaces when they are no longer used as traditional phones: when the phones are shared among peers, bringing also distant friends into the present context, and also through location-based mobile games. In both cases, there is a previously formed community that is nourished and developed by the use of the cell phone. Similar to multiuser environments on the Internet, in which merely the construction of the virtual space was not enough to support a community, the cell phone alone does not create a multiuser experience.

8.3.1.3. **Blinkenlights**: the cell phone as a remote control and game device

Some artworks explore the use of cell phones not as mere phones, but as game devices or remote controls that intervene in public spaces. In 2002, the Chaos Computer Club transformed an eight-story building in Alexanderplatz in Berlin into the world's biggest interactive computer display. One hundred forty-four lamps were arranged behind the building's front windows, which were independently controlled to produce a monochrome matrix of 18 x 8 pixels. Users could "control the building's façade" either via their cell phones or Internet, creating animations, playing Pong, or sending love letters.

Interactors could use their mobile phones to call a specific number and play Pong against the computer. At first they would hear some instructions like "use the 5 to move the paddle up and 8 to move it down." If a second person called the system simultaneously, one would play against each other. The "little" difference from a computer game was the size of the "screen": a whole building in the middle of Alexanderplatz.

Another use for **Blinkenlights** was the possibility of sending love letters to other people. If, for example, you knew your girlfriend would pass by the place at a specific time, you could create an animation with the software "blinkenpaint," which could be downloaded from their Web site, and then e-mailed to the Club. The movie with the love letter would then be placed in the system and the user would receive an access code. With the code, the user could call the system, as if she were going to play Pong, and, when the game showed up on the "screen," dial the access code, which would release the animation. Similarly, one could create a picture just using ASCII characters (0 and 1) in a text file. For example, the pattern below makes a heart in the picture (a pulsing heart):

@200	@800
000000000000000000	000011100011100000
000011100011100000	000111110111110000
000111110111110000	001111111111111000
000111111111110000	001111111111111000
000011111111100000	000111111111110000
000000111110000000	000011111111100000
000000001000000000	000000111110000000
000000000000000000	000000001000000000

The project Web site provides all kinds of tools and software to facilitate the interaction with the system, consisting of one more example of how the Internet can be used to modify public spaces. Also they have a database of the best animations that participated in their contest, which can be downloaded. **Blinkenlights** brought a great number of people to Alexanderplatz. In September 2002, **Blinkenlights** went to Paris.

Pictures 53 and 54: Blinkenlights façade with a love letter
(the pulsing heart) and playing Pong with the mobile.

The importance of these projects is the ability to transform circulation spaces, through which people pass by but no longer stop, into public places were people gather. The space is not used for transit only, but becomes a place where communication occurs and pleasurable experiences happen. Due to media arts, the circulatory *space of flows* becomes again a *space of places*, since installation pieces that intervene in public spaces invite citizens to stop and perceive urban spaces in a different way. Therefore people no longer use urban spaces mostly to circulate and to go from place to place; rather, they start enjoying going to public places as their ultimate goal.

We should not take for granted that cell phones enhance social communication, developing modes of cooperation and not isolation. Some clues on how new mobile technologies are going to evolve will probably come straight from ludic activities, such as the art and the games. The creation of ludic spaces also challenges our imagination and promotes new types of sociability. Location-based mobile games transform public spaces into a multiuser experience.

> “Bjorn Idren lay fast asleep on the couch in front of his TV last month when his cell phone gave an ominous series of beeps. An incoming call? Nope. It was a drive-by shooting. “Bjorn, wake up,” shouted his girlfriend, Sophia Eriksson, 26. “Someone is shooting at you!” Rather than dive under the couch or reach for a sidearm, Idren, 28, grabbed his phone. Too late. He had taken a wireless bullet.” (Kharif, 02 Jul. 2001)

9. (HYBRID) SPACES AS MULTIUSER ENVIRONMENTS

Bjorn Idren did not get hurt. He was part of the location-based mobile game **Botfighters**, created by the Swedish company It’s Alive. Location-based mobile games or pervasive games are played with mobile phones equipped with SMS and GSM positioning, placing the user in a sort of multiuser environment[1] enacted in physical space. The advertisement slogan of **Botfighters**, “The Battle is on the Streets,” describes a game that makes use of urban spaces as its scenario.

This chapter investigates how location-based mobile games (or pervasive games) merge virtual and physical spaces, changing our perception of urban public environments. Games such as **Botfighters, Supafly,** and **The Go Game** are descendants from multiuser environments that formerly took place online. Virtual communities are traditionally composed by people who gather in the digital space of computer networks, most known as cyberspace. During the last decade, it was common belief that the Internet could be the ideal (non) place for community building, as long as users assumed they could create new identities, travel around the world without moving physically, and have no need for face-to-face interaction. Mobile communication devices, like cell phones, are responsible for bringing these communities out to physical space. Cell phones not only enhance communication with distant people by enfolding virtual spaces inside physical spaces, but they also increase interaction among people who share the nearby physical environment. Moreover, the use of cell phones to play games incorporates the ludic characteristic of traditional multiuser environments, also bringing the imagination related to these “places” into urban spaces.

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[1] Developers refer to this type of collective experience as MMORPG, massively multiplayer online role-playing game.

This imaginary playful layer that lays on top of the physical space changes our perception of the city, merging the borders between what is reality and what is imaginary. As these games are multiplayer, they also promote new types of sociability and interaction among users. When games are involved, the hybrid space that merges the physical and the virtual also merges reality and imagination. What are the effects of role-playing games in physical spaces? I also describes how cell phones can be used in other ways not restricted to one-to-one communication.

This chapter begins by defining games and the concepts of *playability* and *gameplay*. I also compare the experience of playing a game with the activities of the tourist and the traveler, recapturing chapter 3's argument that imaginary spaces are created in unknown and unexplored spaces—even if these spaces are folded into or overlaid onto the known space. However, when imaginary spaces are no longer outside, but inside the known space, they start to merge with reality, redefining the borders between reality and imagination. Here I will also remember Eugen Fink's (1966) concept mentioned in chapter 2 in which games can be viewed as symbols of life.

Secondly I analyze different types of mobile games, and question what types of games should be developed for a mobile interface. Emphasis is given on how the concept of "community" moves from the Internet to physical spaces, creating a new perception of the local, as well as new types of interaction among citizens. Some community games played with cell phones in physical space are mentioned in this part, such as the **Nokia Game** and **The Go Game**.

The third part focuses on pervasive games, foregrounding Botfighters, the location-based mobile game developed by the Swedish company It's Alive. Although much simpler than **Majestic**, **Botfighters** succeeded in bringing the imaginary game space into the physical environment, using only cell phones, SMS, and GSM positioning. The thrill and most of the narrative is in the player's mind.

Finally, it merges the main two topics explored in this work: art and games. Addressing apparently opposed subjects, the work of the group Blast Theory in the UK shows that hybrid realities are also constructed by mixing art and games in a physical/virtual environment.

9.1. Games and imaginary spaces

9.1.1. What is a game?

Traditional games are defined in two parts: First, they are a sequence of actions within formal and predefined rules and goals. Second, they are based on winning and losing (Järvinen; Heliö; Mäyrä, 2002, p. 13-14). According to researchers Aki Järvinen, Satu Heliö, and Frans Mäyrä from the University of Tampere in Finland, the rules are used to govern the game for its duration. “Rules both allow and confine players to make choices between different actions within the game” *(Id.).* Moreover, they affirm, the definitions of *winning* and *losing* are translated into points or other qualitative indicators. As we have seen in chapters 3 and 4, Social MUDs, or online multiuser environments challenge this definition. Even though they are descendants from action and traditional board games, Tiny MUDs do not have winners or losers. Furthermore, although they have some set of rules, these rules are flexible, focusing mainly on maintaining the cohesion of the community, rather than on restricting users’ actions.

MUDs (both social and adventure ones) also challenge another common characteristic of traditional games: games generally have another status when compared to reality. According to Järvinen, Heliö, and Mäyrä (*Ibid.,* p. 14), “the events in the game do not affect the states of things outside the game.” However, the most important feature of role-playing and pervasive games is blurring the borders between reality and the game. An article in the *Boston Globe* (Denison, 05 Aug. 2002) affirms that more than 40% of the players in the massively multiplayer online role player game (MMORPG) **EverQuest** play 20 to 40 hours a week. When the “playing” time exceeds the time dedicated to other activities in “real life,” why not consider games “real?” In other words, which window is more important: the one in the computer screen that immerses the player in a modeled virtual environment, or the one that belongs to the life outside the screen? Should we even distinguish between both? Pervasive games are massively multiplayer role-playing games (MMRPG) without the screen. They include characteristics from both traditional and online RPGs. Traditional RPGs are also played outside the screen. Like online multiuser environments, pervasive games connect people who do not share the same contiguous space. Like both traditional and online experiences, pervasive games use quite a bit of players' imagination. However, unlike former types of RPGs, pervasive games happen while players are in movement. The community and the imaginary realms constructed in the game happen in hybrid space. The aim of such games is extinguishing the division line between reality and imagination, virtual and physical.

Roger Caillois in ***Les jeux et les homes*** (1958, *apud* Järvinen; Heliö; Mäyrä, *op. cit.,* p. 12) distinguishes between *game* and *play*. While the game "consists of the need to find or continue at once a response *which is free within the limits set by the rules*," in the practices of play "the rules and margins are looser or non-existent, or they can be spontaneously changed as the playing continues." In this sense, traditional games and action games are related to *games*, while role-playing games are closer to *play*.

9.1.2. *Gameplay* and *playability*: components of a game

Järvinen, Heliö, and Mäyrä (*Ibid.,* p. 17) define *gameplay* and *playability* as essential components of a game. *Gameplay* refers to the time period during which the user plays the game. *Playability*, on the other hand, is connected to the guidelines and rules used to implement the game. In this context, *playability* is "a collection of criteria with which to evaluate a product's *gameplay* or interaction." Social MUDs, for example, are within the limit of what is defined as a game, because they do not have a predefined set of rules that the players have to follow. Rather, these rules are constantly being built and redefined. Also, MMORPGs do not have tempo or pace in the same sense as traditional digital games, in which one has to accomplish a certain mission within a specific period of time. They do not impose a pace on the player; rather, the player contributes to design the game. Furthermore, pervasive games do not have *gameplay*: the *gameplay* is all the time.

As pervasive games do not strictly separate life from the game, or reality from imaginary, they also deny some other common characteristics that belong to games, like the time dedicated to *gameplay*. "The temporal nature of the user experience in digital games is essentially the time devoted to gameplay," argue Järvinen, Heliö, and Mäyrä. (*Ibid.,* p. 27). This means that when playing the game, the player is entirely dedicated to this activity, disconnecting from other instances of life. This characteristic, although also pertinent to non-digital games, matches the attitude of the personal computer user in a broader aspect. Generally when using a PC in order to work on the desktop or to surf on the Internet, the user must stop other activities in the physical world and dedicate exclusively to the interaction with the “virtual” computer space.[2] Conversely, a pervasive game implies that it happens *simultaneously* to other activities in physical space. The game no longer has a playing time separated from the “serious life”[3]; it happens *in between*. Researchers Fiona Raby, Akira Suzuki, and Claire Catterall, from the Royal College of Art, London, define the space “in-between” created by cell phones as a game experience:

> A space we called daydreaming. A space that began to blur fiction and reality. A space of imagination played out in the city streets. A space that used the movement and activities of the participants as content, continuously feeding back into a fictional narrative, and where fictional creatures could work themselves into people’s everyday routines and start to infect real space. Where information could become play. (Raby *et al.,* 2000)

MMORPG already offered some possibility to share the *gameplay* with life through multiple windows opened in the computer screen. In the desktop context, one window could be used to search on the Internet, another one to check the bank account, and another one to play the game. However, nomadic technologies, when used as the game interface, are much more powerful in bringing the game into life, because users carry them wherever they go. Digital video games and MMORPG are still disconnected from physical space because they happen in the virtual space of the computer screen. Pervasive games, in turn, happen here in this world, changing our perception of it, creating an imaginary layer that merges with reality. For instance, when a player “shoots” another one in **Botfighters**, it is clear that the wireless bullet will not hurt the player. Nevertheless, it does influence players’ “real” life, changing their actions in physical space. The quote in the beginning of this chapter is an example of how the game intervention can make the player literally run away to chase the “shooter.” Of course players know it is a game, but the game no longer has a *gameplay*. The *gameplay* can be all the time, because the game accesses the player, instead of the player playing the game.

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[2] For more information, see chapter 1, **Defining cyberspace.**
[3] Cf. Fink, Eugen, in chapter 2, **Defining virtual**.

Järvinen, Heliö, and Mäyrä *(op. cit.,* p. 27) suggest that in a traditional game there is no idle or "dead" time, i.e., a period when nothing happens. On the other hand, they observe that other forms of digital entertainment like chats function with a strong presence of "dead" time. Like chats, pervasive games also need idle time, because they are mixed with life—the player is accessed "in-between," in sporadic time intervals.

Finally, Järvinen, Heliö, and Mäyrä *(Id.)* point out four components of *playability*: functional, structural, audiovisual, and social playability. The functional component is related to physical interfaces used to play the game, for example, game consoles or mobile phones. The structural component is the game's set of rules. The audiovisual component is the game's graphic interface, in the case of digital games. Lastly, the social playability refers to the community aspects of the game. Not all games have all components. Especially pervasive games lack the third one: the audiovisual component. Due to the enormous popularity of digital games with complex 3D graphic interfaces, game users and developers generally consider the audiovisual component as an essential factor for a successful game. As a result, because cell phones had small and monochromatic screens, they were regarded as inferior game interfaces. Many manufacturers have been waiting for the third generation of cell phones with color screens and high-quality graphics to launch mobile applications. "Current technology is certainly basic," writes Clare Swatman for the online magazine *Revolution* (10 Oct. 2001), "many of the games currently being developed for the wireless gaming community aren't much more advanced than early video game classics such as Pong." Johanna Hytonen, spokeswoman for game development company Riot-E also argues, "The possibilities are still limited, but with 3G and GPRS we foresee a whole new variety of products coming and people interacting with each other" *(Id.).* However, isn't betting on color screens and broadband connection the same as focusing on mobile devices as personal computers and not foreseeing characteristics unique to the mobile interface? If 4G with large projection screens and data glasses will only come in 2020 (Cf. Baxter *et al.*, 29 Oct. 2003), until then mobile games will be played in the small screen, and there is no way to compare its graphical capabilities to a conventional PC monitor.

We shouldn't forget that the most popular MUD, **LambdaMOO**, never needed graphic interfaces in order to create an immersive social environment. As I mentioned in chapter 3, Julian Dibbell (1998, p. 52-53) suggested that taking the map out of the game, that is, hiding its graphical representation as a territory, was the strongest reason to immerse the player into the game. Once the map is hidden, players must reconstruct the environment with their imagination. Accordingly, pervasive games have no graphic representation. As these types of games are played in physical space, the game board corresponds to the city space itself. Do pervasive games accomplish the old desire of constructing a map which is the size of the territory? The wish to build such a map was an effort to design a perfect representation, one that would mix with the territory itself. As a result, inhabiting the territory would be identical to inhabiting the map. In pervasive games, players are actually inside the map, and each player represents her own avatar. In traditional online games, users must create avatars in order to penetrate the game. Pervasive games invert this relationship. **Botfighters's** players need to go to a Web site to create a robot, which is then embodied by the user in the physical space. Consequently, the avatar no longer represents the user; it is the user who represents the avatar.

Like textual MUDs, **Botfighters** is partially played with text messages. As a result, much of the game fantasy is developed in the players' minds. The advertisement video from It's Alive shows a boy peacefully seated in a cafeteria in Stockholm, when he sees a beautiful girl walking on the street. Suspecting that she is in fact a robot, he catches his cell phone and leaves the cafeteria immediately. Suddenly, his mobile starts to beep, confirming his belief: "robot nearby," he reads on the screen. The boy, then, transforms into his avatar: a robot armed with a gun, and runs after the other robot. The girl, realizing that she's being chased, shoots. The boy shoots back. A battle begins on the streets. The boy, however, is faster, running away from the female robot's radar. The transformation from boy to robot is a metaphor that pushes the game narrative, indicating that player and avatar are one and the same. The avatar behaves according to the player's movement in the physical world, and can be targeted by different players, depending on its location.

Although pervasive games do not immerse the player in a virtual world, like traditional MMORPG, they are not completely played in the physical space. The imaginary layer that represents the game narrative, when overlaid onto urban spaces, creates a hybrid space through which the player can move, and which has the shape of the physical city but the mixed content of reality and imagination. Pervasive games are another example of how imaginary spaces can be created even within the known space,[4] transforming the familiar into the strange.

9.1.3. Shopping, traveling and playing games: trips to the unknown?

Finnish researchers Turo-Kimmo Lehtonen and Pasi Mäenpää (1997, p. 146) suggest that the activity of shopping can be compared to tourism. Both are leisure and pleasurable experiences. Moreover, both of them take place outside the everyday spheres of home and work. "What is fascinating about both," they suggest, "is the encounter of the new and the unexpected and the experience of being 'somewhere else.'" Yet while the tourist really goes "somewhere else," the shopper transforms the familiar space into a new and unexpected environment. Using the case study of a shopping mall in Helsinki, they propose that going shopping means looking at the everyday environment with the eyes of a tourist. "As an experience, going to the mall means having a trip 'somewhere else,' where the real world is constantly challenged by the possible world" (*Ibid.,* p. 147). The difference from a tourist experience would be that the everyday shopping environment is generally inside a familiar urban space.

Considering the above-mentioned characteristics, it is clear that shopping and tourism also bear a close relationship to the act of playing. All three take place outside the customary events of everyday life, and all are some type of controlled adventure. However, pervasive games are actually closer to the experience of the traveler, rather than the tourist. According to what has been said in chapter 5, the traveler looks for non-controlled adventures, while exploring physical spaces, with no fixed destination or return date. The experience of pervasive gamers could be even closer to the nomadic movement,[5] because players roam around the same territory when participating in the game. Nevertheless in shopping, tourism (traveling and roaming), and pervasive games, "the central aspect is the experience of movement and the special relationship with the environment" (*Ibid.,* p. 147).

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[4] The first example, discussed in chapter 8, included science-fiction stories about nanotechnology.
[5] See also chapter 5**, Defining Hybrid Spaces,** in part 5.2.2: "Nomadic spaces created by nomadic technologies."

Lehtonen and Mäenpää (*Ibid.,* p. 153) affirm that it is not easy to distinguish play and games from the rest of the world. Yet according to Johan Huizinga (1955) they define playfulness as a natural characteristic of the human being, and therefore the constitutive basis of culture itself. "Play is a free activity standing quite consciously outside the realm of 'ordinary' life as being 'non serious,' but at the same time absorbing the player intensely and utterly" (Lehtonen; Mäenpää, *op. cit.,* p. 154). Still according to the authors, "this definition should, though, be supplemented with Georg Simmel's[6] emphasis on the fact that play should not lose all of its connection to the 'serious,' if it is to remain interesting and not become 'empty play'" *(Id.)*. Consequently, play is considered an autonomous, imagined sphere inside reality that aims at joyfulness and entertainment. Lehtonen and Mäenpää *(Id.)* consider "real" something that has to do with the seriousness of everyday constraints and necessities.[7] In this sense, shopping, as well as games, are pleasurable activities that transcend everyday routines, and are, therefore, outside reality. Furthermore, "the playfulness of shopping is always connected with public spaces both in cities and in large malls." Shopping, as well as pervasive games, always *take place* in public spaces.

However, they also mention, following Georg Simmel[8] and Richard Sennet,[9] that modern metropolises represent environments in which strangers are likely to meet, though they do not necessarily talk to each other. There is a sort of private space inside public spaces that prevent strangers from communicating. As a result, sometimes this sense of privacy in public spaces can actually become a feeling of loneliness, because citizens are also indifferent to each other. While not communicating, citizens observe and fantasize about others' behaviors and personalities.

> The public city space is a social world of fantasizing individuals who share the seen reality while having private inner worlds of dreams and private associations of images. They refrain from actual interaction, but use others and the signs they transmit for purposes of inner-directed pleasurable contemplation. (Lehtonen; Mäenpää*, op. cit.,* p. 155)

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[6] Simmel, Georg. The metropolis and mental life. In: Kurt H. Wolff (ed.). **The sociology of Georg Simmel**. Glencoe, IL: Free Press,1950. p. 43.
[7] Where Lehtonen and Mäenpää say *real*, I understand as *reality*, since I consider real as including both concepts of virtual and reality (which is one actualization of virtual).
[8] *Op. cit.*
[9] Sennet, Richard. **The fall of public man:** on the social psychology of capitalism. New York: Vintage Books, 1978.

In the modern metropolis people are as far from each other as much as they are close.[10] As has been previously stated in chapters 1 and 3, cyberspace has been regarded as an easier way to meet and communicate with strangers, when compared to urban spaces. First, people feel safer in the virtual space of the Internet. Second, a stranger inhabiting the same chat room wouldn't appear stranger than a person seated in a cafeteria in the city. Actually, people would feel closer, because there would be less compromise in approaching a "virtual" persona than a "real" person.

Although still recent, pervasive games aim at bringing communication back to urban spaces. Using the cell phone, one can actually talk to people who are nearby, sharing the same physical environment. "Mobile phone technology can connect both a gamer with both other mobile phone users nearby through cellular positioning services as provided by CellPoint, or with your friend that is halfway across the globe from you," writes journalist Jörgen Sundgot (05 Dec. 2000). Cell phones can therefore represent a new way of knowing people who live in the same environment, formerly just an anonymous face in the city space. Games like **Botfighters** are action games, not created for communication, though they still do stimulate communities in hybrid spaces. Sven Hålling, It's Alive's CEO tells:

> We have learned from focused group discussions that players even use **Botfighters** for communication, although it is designed as an action game: if you walk by a friends' house, you can fire a couple of SMS shots just to say hello, and if she's in good mood, she'll react. (Stegers, 08 Feb. 2002)

I do not believe that MMORPG, or online multiuser environments will disappear because of pervasive games. However, pervasive games have an important function in transforming our experience of public spaces and the self. These games not only represent life, but also partially coincide with it. Following Eugen Fink (1966, p. 110), mentioned in chapter 2, the game can only exist if it has an intrinsic connection to life, rather than being out of it. In current pervasive games one has to choose an avatar in the game Web site. However, as long as the player represents her avatar, and not the opposite, borders between both are no longer so strict.

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[10] The non-communication in the city space of Los Angeles, analyzed in chapter 5, is an example of the above-mentioned situation.

The unpredictability that belongs to these types of games also contributes to merge the borders between reality and the game. According to Lehtonen and Mäenpää (*op. cit.,* p. 156) unpredictability is also a characteristic of shopping, embedded in what they call *street sociability*. Street sociability is "the particular public form of sociality, of being at once both interested and yet indifferent and anonymous." While in the city, one cannot foresee whom one is going to meet or what is going to happen. It is exactly this unpredictability contained in shopping that makes it so exciting as an unexpected playful experience.[11] "It is a question of a similar anticipatory expectation as in games of chance: something might happen. And this is the basic mood in the game of shopping" (*Ibid.,* p. 159). In **Botfighters**, for example, one never knows when a wireless bullet might come.

Another common characteristic between shopping and games is that they are both producers not only of imaginary spaces but also of imaginary selves. "Shopping means fantasizing about oneself as someone else. It is imagining oneself being in a new way, as one pushes the limits of the image of the self in a desired direction" (*Ibid.,* p. 160). Lehtonen and Mäenpää *(Id.)* suggest that people shopping are like children playing roles, which is a ludic experience per se.[12] However, if producing imaginary spaces and selves is a characteristic of games in general, how do mobile games differ from other traditional and online games?

9.2. Mobile games and mobile communities

9.2.1. Defining mobile games via mobile interfaces

Since cell phones have become popular, mobile and wireless technology developers are looking for the "killer application" for mobile devices. While many have thought about online shopping, weather forecasts, and money cards to buy in

[11] Authors also suggest that "even though we emphasize unpredictability as the key to playful street sociability, it is important to note that this entertainment aspect of uncertainty relies on mutual trust between the 'players.' (…) If the implicit rules of street sociability are not followed, the aleatory elements, the feeling that 'something unexpected might happen,' starts to generate fear." (Lehtonen; Mäenpää, 1997, p. 161)

[12] The authors also wrote that "it is reasonable to assume that the course of the individual trajectories of self-building through shopping are highly predictable, and that the changes made are small. Still, we find it necessary to stress that lying at the core of the ideal shopping experience is the feeling of freedom from restraints to the self fixed to everyday life and a becoming aware of the open world around" *(Ibid.,* p. 160).

supermarkets and vending machines, it is increasingly clear that producers are betting on entertainment services, more specifically on mobile games. “I would dare to say that in the short term, wireless gaming will be the mobile killer app,” declared Fredrick Diot, a consultant with Data Monitor at the end of 2000 (Brown, 01 Dec. 2000). Indeed the A.T. Kearney report (2003) affirmed that entertainment and communication services are the most looked for activities when using the mobile Internet. But since the mobile Internet is not yet pervasive, mobile games explore other features of cell phones, like SMS and cellular positioning, defining the device as a feasible interface for playing games.

The bet on mobile games is based on the success of PC-based games. The difference is that mobile phones are always with the user, so they are much more ubiquitous interfaces. If PCs are accessed only in specific places (except for laptops), mobile phones can be used anywhere (where there is a signal). Furthermore, cell phones are much cheaper than laptops and therefore affordable for a larger number of people. In addition, many people would not buy a Playstation to specifically play games, but if games are embedded in cell phones, they can become part of other activities, and a means of using the device “in between” other actions. “Nintendo reported to have taken 10 years to sell 100 million Game Boys whereas the mobile phone industry will sell around 400 million mobile phones worldwide in 2001 alone,” wrote Andrew McLorinan for an Ericsson Press Release (18 Jul. 2001). Besides being affordable and ubiquitous, cell phones can also be regarded as built-in platforms for game playing. They consist of a screen and a set of keys that can be used as different commands to conduct the game.

However, a mistake has been trying to simply transfer complex PC-based games to mobile handsets without taking advantage of the new interface. When trying to get hard-core gamers (like the ones which play **EverQuest** 40 hours a week) to move to the mobile interface, the only possible outcome can be disappointment. “Despite the proliferation of cell phones this year, none of the handsets is good enough for serious gamers,” said John Smedley, chief operations officer for Sony Online Entertainment (Batista, 17 Oct. 2002). As expected, they think mobile screens are too small and their resolution is poor. Moreover, the Internet connection speed is extremely slow when compared to PCs, making it time-consuming to download pictures, video, or sounds.

The ones who bet on complex graphic interfaces for mobile games are excited with the new Java-enabled handsets that support downloadable games written in J2ME, with sophisticated graphics. "In Japan (where mobile games are hugely popular) some 90 percent of new phones already have color screens" (MacLorinan, 18 Jul. 2001). Mobile games in that country are so popular that they overshadow other wireless services, such as music delivered over cell phones. "Of all wireless Internet applications, consumers are only willing to pay for messaging and games," attested Eric Goldberg, founder and president of the wireless gaming company Unplugged Games (Kharif, 02 Jul. 2001). The high-quality handset screen is one of the reasons for mobile games' popularity in Japan.

Despite the I-mode always-on connection, the Japanese are more likely to play individual games, which, once downloaded, are not connected to the network. These games include virtual pets fed by photos, pronunciation puzzles, and high-resolution graphic games as sophisticated as PlayStation One titles, like **Ridge Racer** and **SimCity**, including full interactive 3D environments. "In Asia there seems to be a lot of focus on downloadable games and one-against-the-machine type of games, whereas in Europe I believe that multiplayer games will take off much faster," suggests Sven Hålling (*It's Alive press release,* 13 Mar. 2002). He goes further and claims that "the U.S. is still not very interesting" (to launch mobile MMRPG) "since operators cannot charge for anything, although Americans seem to be much more fascinated about action and violence than the average European."

Picture 55: Japanese mobile games with high-quality screens.

Due to the screen quality improvement, MMORPG are slowly being transferred to mobile handsets. One of the first was **Gladiator II**, launched in October 2000 on Sprint's network in the US. It is a fighting game in which players challenge each other to head-to-head arena combat and grow stronger with each victory, writes reporter Olga Kharif *(op. cit.).* However, according to D. C. Denison from the Boston Globe, it is a "rudimentary, almost stick figure-like game" (05 Aug. 2002). European cell phones allow more sophisticated graphic games though. T-Mobile in Germany launched in September 2003 **TibiaME**, a MMORPG for the mobile phone. The game, according to T-Mobile, "allows hundreds of mobile phone users to interact simultaneously and experience adventures in a virtual world" (Sundgot, 04 Sep. 2003). The game contains more than 1,000 screens including cities, woods, mountains, and dungeons. Furthermore, users can fight 15 different creatures such as bugs and trolls, and look for more than 60 items like swords, shields, and magical portions. Although interesting, MMORPGs have nothing to add to the game experience when transferred to the mobile phone. Though the game allows interaction with people in the digital space, it is probably better to play such a game with a larger screen in the comfort of one's home, and not while in motion.

Picture 56: TibiaME interface.

Recent research[13] suggests that the future mobile player will not have the same profile as the hard-core PC player. Therefore, there is no reason to simply transfer PC games to mobile handsets in order to attract this audience. If hard-core gamers won't move to cell phones, it is feasible to wonder what type of new mobile gamer crew is ready to emerge. Mobile gamers "are not ordinarily reached by the traditional electronic games. The cell phone audience does not consider themselves gamers," points out journalist David Kushner (Deninson, 08 May 2002). The report from the European Commission Directorate-General Information Society (2002) suggests that casual gamers will constitute the majority of the mobile game population. Traditional hard-core gamers (considered people who play more than 10 hours a week) will only be attracted to mobile gaming "once complex graphic-based games are available, enabling them to remain in touch with their virtual gaming universe at all times" (*Ibid.,* p. 180). Moreover, the majority of mobile gamers will be current non-gamers, who will play occasionally, in the "in-between" time. Therefore, "the most popular games will most likely be based on gameplay rather than on graphics. They will also incorporate the true nature of the mobile phones: communication and location" (*Ibid.,* p. 179). Mobile games need to be fast and simple in order to be played in between activities.

Understanding the interface capabilities is critical to foresee the future and create content for the new medium. "Certainly a cell phone can't really be compared to a modern game console. The key is to use the phone-specific features such as mobile

[13] Report from the European Commission Directorate-General Information Society (2002).

positioning," suggests Jörgen Sundgot from InfoSync World (05 Dec. 2000). Howard Rheingold (2002, p. xv) also focused on mobile positioning as a significant characteristic of mobile devices:

> Perhaps even more important than the evolution of color and video screens in telephone displays is the presence of "location awareness" in mobile telephones. Increasingly, handheld devices can detect, within a few yards, where they are located on a continent, within a neighborhood, or inside a room.

Location-awareness technology allows mobile operators to pinpoint users' position within "cells" formed by their phones' locations relative to nearby transmitters. According to Wired News' journalist Michael Stroud (08 Feb. 2002), in the United States this "capability is now required for all mobile operators to ensure that rescue workers can locate mobile users who are in trouble." Besides helping rescuing people and playing games, location-based services could also be used to help workers and form communities.

> Think about how small companies might team up on a job. Let's say you're a carpenter and you realize at short notice that you need to get a plumber. You could look at your phone and see who's available, someone in the region who doesn't have an appointment. Clearly, this is an application not for the PC, but for the cell phone,

says Ulf Avrin, president of a joint venture in Kista between Ericsson and Microsoft (*DallasNews,* 20 Feb. 2001).

However, location awareness is still cautiously regarded in many countries. Many places do not use location-based services mostly to avoid surveillance and control rather than because of non-available technology. Sven Hålling declares that many European countries are still conservative regarding location-based mobile phones (Stegers, 8 Feb. 2002). For example, in Denmark there are tough restrictions on location-based services for locating other people. Similarly, in Germany operators seem to think that there is a similar law, and thus It's Alive is having trouble launching **Botfighters** in both countries. This attitude is based on the fear that many people have about being tracked down and losing their privacy and security. However, Hålling affirms:

> The accuracy of the location systems used are at best more or less several hundred meters in a city center. Would be hard to pinpoint your guy in a crowded street with that level of accuracy. On the country side accuracy may be in the order of kilometers. When accuracy is improved by using GPS receivers in the handsets, the game design will get adapted by introducing sufficient level of inaccuracy in order to protect personal integrity. (Farber, 11 Feb. 2002)

The company also gives people warnings like "don't give out your name" or "don't be too accurate about your location," in order to help preserve players' privacy and security, if they wish. In addition, similar to ICQ[14], people always have the option to block out some people who get too friendly (Stroud, 22 Jan. 2003).

Compared to location-based games, SMS games are much more common. Basically all cell phones today have SMS capabilities. Moreover, in Europe and Japan sending messages is sometimes the most used cell phone feature, as was said last chapter. An SMS game developed by Finnish company Akumiitti, for example, consists of receiving cartoon pictures and choosing which way the story goes by sending in choices as text messages. SMS is a simple way to reach users and get quick responses. Paul Zwilenberg, managing director of <kpe>, an interactive branding consultancy, says that another advantage of SMS is that "last-minute changes are easily made to SMS games, as they do not require graphics" (Swatman, 10 Oct. 2001). SMS-based games are viewed as much easier and more dynamic when interacting with the user than, for example, WAP-based games.

Curiously, one of the most popular games in Japan in 2000 was Fisupeli, a Finnish virtual fishing game played with SMS.[15] Fisupeli differed from other traditional mobile phone games because it was designed to be played anywhere, taking no longer then 10 minutes for each fishing trip. The fishing game starts when the player sends the text message 'FISU' to number 400. After this, she receives a text message describing the fishing environment. The player "fishes" one to three fishes as a text message each time she goes fishing. "Japanese phone users have been reported to skip out of meetings when they receive a virtual bite in the interactive fishing game" (Kharif, 2 Jul. 2001). SMS-based games are interesting because they are pervasive, that is, they can access the user anywhere, anytime. When combined with location awareness, they create a new concept of game playing: one that brings the game into the physical environment.

Multiuser games, SMS games, pervasive gaming, and Java downloads are some of the current game genres that wireless users are offered. Investing in mobile games, cell

[14] ICQ stands for "I seek you". The Internet chat can be found at http://www.icq.com and it is a way of getting in touch with people and finding peers with similar interests. Adding users to one "friends' list" indicates when they are online and available to chat.
[15] It's worthwhile to remember that in 2000 Japanese already had I-mode, launched in 1999.

phone developers try to transform the mobile phone into a device that goes beyond just talking.

> While almost all consumers—98 percent of them—still use their cell phones only to make calls, there is already a loyal following for so called wireless data services, including e-mail, messaging and more whimsical features like ringtones you can download and phone screensavers. Cell phone users already send between 5 million and 10 million short text messages each day. (Batista, 16 Oct. 2002)

Mobile games, if properly developed, will change the way people look at cell phones. "Many people in the industry are hoping games will help expand the typical users' perception of a cell phone from primarily a voice-oriented unit to more of a voice/data service," says Dana Thorat, a research analyst who covers the wireless and mobile industry for Framingham-based IDC (Denison, 05 Aug. 2002).

Since cell phones are communication devices, trying to find out which of their features can be employed to construct a new concept of game necessarily includes networks and communities.

9.2.2. Mobile communities: when each person becomes the network node

What does it in fact mean to be a mobile community? Howard Rheingold (2002) pointed to the emergence of mobile communities created by the use of nomadic technology devices. Among other characteristics, mobile communities are networks in which the nodes are people, instead of machines. Furthermore, mobile networks are by definition non-static, that is, their paths and nodes are constantly moving and being reconfigured as a function of the dynamic relationship among the (human) nodes. More important, mobile networks happen in physical spaces, thus directly influencing and transforming the environment in which we live. Structurally, digital networks also happen in physical space, but they connect computers as nodes of this network, instead of people. Certainly people can use computers as interfaces to get into the network and therefore connect to other people. However, digital network[16] nodes are essentially static. Any change in a digital network reconfigures flows of information passing through it and

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[16] Cellular networks are, technologically, digital networks. However, the term "digital network" is used in this work as a reference to the network shaped by personal computers, which constituted, mainly, what was analyzed as cyberspace. Conversely, mobile networks are characterized by nomadic technology devices.

rearranges a digital space which is constructed by connected computers, but does not reconfigure public spaces in real time. Conversely, mobile networks have the power to transform the physical environment that surrounds each user/node, even if the users do not share the same contiguous physical space. Connecting distant places, it creates a hybrid space that moves and reshapes itself while users are connected, generating foci of convergence and divergence depending on the users' actions/movements.

Mobility adds an important feature to telecommunication networks, because it allows coordination among the network nodes. Whereas using a static interface fixes the user in a specific place, mobile interfaces allow users to gather and disperse, bringing new meanings to tele- and close communication. According to Rheingold (*Id.,* p. xviii):

> Location-sensing wireless organizers, wireless networks, and community supercomputing collectives all have one thing in common: they enable people to act together in new ways and in situations where collective action was not possible before.

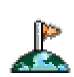
Sometimes a simple technology like SMS is enough to create mobile networks. The use of a cell phone or a PDA that receives e-mail messages might have the same effect, but as mentioned before, the mobile Internet is not yet ubiquitous, while almost all cell phone users have access to SMS. In chapter 6, I mentioned acts of macrocoordination described by Rheingold (*Ibid.,* p. 160) as one of the possibilities of mobile networks' actions via SMS. He mentions how Filipinos used text messages to spread rumors, jokes, and information that steadily eroded the legitimacy of President Estrada, leading to his fall. After some senators associated with the President succeeded in stopping the President's impeachment process, opposition leaders started to broadcast text messages in order to call citizens to gather. In 75 minutes after the failed impeachment, more than 20,000 people converged on EDSA, Manila's central thoroughfare. "The rapid assembly of the anti-Estrada crowd was a hallmark of early smart mob technology, and the millions of text messages exchanged by the demonstrators in 2001 was, by all accounts, a key to the crowd's esprit de corps." Another example of mobile community promoted by nomadic technologies, Flash Mobs, has also been mentioned in chapter 6. The acts of gathering and acting together are coordinated by SMS messages exchanged among the group. Mobile communities thus happen in physical space and allow coordination among its members. This concept fits perfectly with the idea of mobile games. Inside this context, flash mobs evolve into community games such as **The Go Game** and **Geocashing**.

Geocashing[17] is not played with a cell phone; it uses GPS devices as the game interface. According to its creators, it is an “entertainment adventure game for GPS users.”[18] The goal of the game is finding hidden caches in weird and inaccessible places with the aid of a GPS device. The game slogan, in clear comparison to the Internet, says: “**Geocashing**, the sport where you are the search engine.” In order to play the game, the first step is going to the Web site and finding where caches are located. In November 2003, caches could already be found in more than 180 countries, including Brazil. The Web site has each cache’s coordinates which the player must download to the GPS device in order to find the hidden object’s location. The coordinates give the exact location of the object on Earth. Games like **Geocashing** became possible when the Clinton administration removed the GPS signal degradation called Select Availability (SA) on May 1, 2000. Afterward GPS devices became much more accurate and it has been possible to locate specific places and objects on the globe. **Geocashing** rules are fairly simple, yet the game is interesting because it focuses on exploring physical spaces, and connecting people who have the same interests. Furthermore, the game Web site advises: “It’s one thing to see where an item is, it’s a totally different story to actually get there.” Indeed one player (who bought a GPS device with the only aim to play the game) told me that there are hidden caches in the most unlikely places, like the bottom of a lake, or the top of a huge mountain, where only professional divers or climbers can reach.

Each cache is classified according to a type, and two numbers that range from 1 to 5; the first number indicates how difficult it is to find the cache and the second one shows how tough the terrain is surrounding the cache. Number 1 means easy; number 5 means hard. The *traditional cache*  consists of a container and at least a logbook inside it. After finding the cache, the player must sign the logbook and report that she found the cache to the player who hid it. The note is then posted to the Web site. If, besides the logbook, there is also any object inside the box, the discoverer is allowed to take it, as

[17] Available at: http://www.geocashing.com. Accessed on: 17 Dec. 2003.
[18] All quotes related to **Geocashing** are from the game Web site.

long as she leaves another object in the box. The rule is, "if you take something, leave something in return."

Anybody who can search for a cache can also post one. As the game developed, more users got involved with it, creating new types of caches. Today there are eight cache types. The first one is the *traditional cache,* mentioned above. The second one is the *multi-cache (offset cache)*  *,* which consists of two or more locations. Generally the first cache has tips for the second location and so on. The final cache is always a physical container. The third type is the *virtual cache* . Interestingly, the virtual cache is a physical place. The virtuality refers to the physical container, which is absent in this case. Virtual caches should be an outstanding place, "out of the ordinary enough to warrant logging a visit." The virtual cache should be an answer to a question about a location and the reward is the location itself. The *letterbox hybrid cache*  is another form of treasure hunting that uses clues instead of coordinates, in order to find the place. The fourth type, the *event cache*  is posted when local geocashers and geocashing organizations designate a time and location to meet and discuss **Geocashing**. The event cache is in fact the largest community feature of the game, allowing players to actually meet each other. Other types of communication among players are done via the Web site and between the player who posts and the one who finds the cache. Another type of cache is the *Webcam cache* , which uses existing Web cameras placed by individuals or agencies that monitor various areas like parks or road conditions. "The idea is to get yourself in front of the camera to log your visit," says the game Web site. "The challenging part, however, is that you need to call a friend to look up the Web site that displays the camera shot. You will need to have them to save the picture to log the cache." The seventh type, the *mystery or puzzle cache* , involves complicated puzzles that the player needs to solve in order to determine the cache's coordinates. Finally, the *locationless (reverse) cache*  can be considered the opposite of a traditional cache. "Instead of finding a hidden container (via GPS coordinates)[19], you are given a task to locate a specific object and log its coordinates." The *locationless cache* should be in fact the *virtual cache*, because it refers to a cache with no place. However, obviously the *locationless cache* is a physical place; what evokes its placelessness is the absence of coordinates, that is, the map. Removing the coordinates is like removing the map, thus transfoming a place into a non-place, or a virtual place.

Nomadic technologies have a strong relationship to physical space, and, as we have seen in chapter 3, the act of mapping space is extremely connected to mobility. **Geocashing** actually uses GPS devices to map territories and find treasures, transforming the physical environment in which we live into an unexplored territory. The emergence of imaginary spaces was connected to the activity of travelers, who went to unknown places and mapped new territories. The well-known tale about finding hidden treasures in lost islands is particularly connected to this type of imaginary space, when one would find precious objects in unexplored spaces. The idea behind **Geocashing** traces back to travelers' movement through unfamiliar spaces. The geocasher also has to report back her discoveries in the game Web site (the center and known space of the game). **Geocashing** succeeds in using a nomadic technology in order to stimulate players to go to unknown places, map these spaces, and find hidden treasures, much like the old travelers did. The difference, however, is that **Geocashing** is played in the known environment. Surely an American can try to find caches in Uganda, but generally caches can be found no more than 5 miles from one's home. And it is really exciting to know that there is a mysterious hidden "treasure" in a place that looked familiar before. This movement of transforming the familiar into the strange, like the shopping experience, is what drives mobile games.

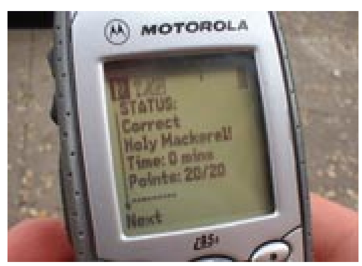
A similar initiative has been accomplished by **The Go Game**.[20] Also released in the U.S. in 2003 **The Go Game,** according to the developers, "is an all-out urban adventure game, a technology-fueled, reality-based experience that encourages hard play and a keen eye for the weird, the beautiful, or the faintly out-of-the-ordinary."[21] In order to play the game, users must form groups that go across the city on some kind of collective mission. Groups are generally formed with five people, but a person can also

[19] Author's parenthesis.
[20] Available at: http://www.thegogame.com. Accessed on: 17 Dec. 2003.
[21] All quotes about **The Go Game**, unless noted, refer to the Web site.

sign in alone and join an existing group. The center of the game, like **Geocashing**, is also a Web site in the Internet. At the Web site users can sign up for the game, form groups, and download a series of clues to the wireless device that will help accomplish the mission. Hints are also placed in unlikely places, like public bathrooms, parks, and buses. Like **Geocashing**, **The Go Game** is played out in physical space. The game Web site is used as a support and central place for the users, but the action actually happens out on the streets. Additionally, similar to **Geocashing**, it aims to transform the familiar into the strange, thus creating the necessary imaginary space that all games require: "You'll be guided through a city you only think you're familiar with."

Examples of missions are riding a bike with someone one suspects to be a spy, or deciphering cryptic clues embedded in a public mural. Games generally last for one afternoon and players are provided with cell phones and digital cameras as interfaces. Steven Johnson (17 Feb. 2003) describes the game as:

> Small groups of people clustering together to read text off of cell-phone screens, then embarking on some kind of oddball group activity—retrieving a suitcase that's been hidden atop a tree, persuading strangers to try on insane outfits—and then huddling together again to peer at their cell phones.



Pictures 57 and **58: The Go Game** team and interface.

Games like **Geocashing** and **The Go Game** have the common characteristic of widening the game environment. The game arena is no longer confined to a board or to a computer screen. When the game board becomes the physical space which we inhabit, there is no longer the need for avatars or any sort of representation of the body, because users are already physically immersed in the game. Generally, "to enter the world of the game or the story, you enter a confined space, set off from the real world," affirms Steven Johnson *(Id.)*. "Play-space doesn't overlap with ordinary space. But **Go** … colonizes an entire city for its playing field" *(Id.)*. These games are possible, among other reasons, because of the emergence of wireless interfaces, which allow players to keep in contact with others regardless of their locations, and help them to navigate physical space.

Although **Geocashing** and **The Go Game** broaden the game environment, they do not succeed in merging real and imaginary spaces. Certainly there is some overlap, but in order to play **The Go Game**, for example, people sign up for a one-day mission, and they know that this time is entirely dedicated to play the game. Similarly, **Geocashing** players must decide to go search for the hidden object and then dedicate a specific time for it. These mobile games succeed in transforming the experience of space, converting the familiar into the strange, but the *gameplay* (the time dedicated to play the game) is still restricted.

Trying to envision a new concept for mobile games, It's Alive implemented pervasive games. Sven Hålling suggests, "wireless games could be both more ubiquitous and more integrated into daily life. You are walking around in an adventure when you are out on the streets" (Kharif, 02 Jul. 2001).

9.3. Pervasive games: when game merges with life

9.3.1. Introduction to pervasive games: **Majestic**

Pervasive games broaden the game environment, because they occur anytime, anywhere. Not only is the game played outside the borders of a board, or a computer screen, but it can also happen unexpectedly. Therefore, there is no longer *gameplay*. The *gameplay* might be always, that is, the game environment never stops running. In this sense, pervasive games are closer to Tiny MUDs, analyzed in chapter 3, in which there is no time limit for playing, and the narrative develops endlessly until one disconnects from the Internet. But how do you disconnect from the environment in pervasive games, provided that the game space is the same space in which we live? Pervasive games aim to "invade" the player's life and "summons" one to play even when one is offline.

Majestic was an early but frustrated attempt to create a pervasive game, launched in summer 2001 by Electronic Arts in the USA with massive advertisement campaigns. It was described by EA as "a powerful suspense thriller where the lines of reality are quickly blurred" (Dodson, 31 May 2001). **Majestic** aimed to immerse the player in the game narrative by means of diverse media, like e-mail, text messaging, voice mail, and fax.

Majestic's narrative put players at the center of a "sinister conspiracy theory involving covert government agencies and menacing fugitives" *(Id.).* Publicity warned that **Majestic** could actually call the player in the middle of the night or interrupt a regular working day. Another advertisement for the game claimed that **Majestic** was "the suspense thriller that infiltrates your life through the Internet, telephone and fax, then leaves you guessing where the game ends and reality begins" (Halpin, 22 Jul. 2002). In this sense, **Majestic** aimed to be the most complete pervasive game ever. "Pervasive games do not wait until the player chooses to sit down at the terminal to play. They phone, fax or e-mail the player demanding attention and making it clear that the player must take immediate action to compete successfully" (Guildford, 11 Dec. 2002).

Much has been said about **Majestic**, but the game did not quite work as expected. Many reasons have been conjectured. First, the game narrative had not been complex enough to make players think they were indeed real. The game began with an e-mail from Electronic Arts saying that there had been a fire at the studio that produced the game, Anim-X, and the game had been postponed indefinitely. After this message, a user who signed for the game, Klint Finley (01 Nov. 2001), tells he tried to go to the **Majestic** Web site, in which there was a "server down" message and that included a link to the Anim-X server. "If the server was really down, why did it display a custom message with the URL of the Anim-X Web site? Furthermore, if the Anim-X offices burned down, why was the Anim-X site still up but the Electronic Arts site down?" questioned Finley *(Id.).* He explains that this "unrealistic detail" made it obvious that he was playing a game.

A second reason for the game failure might have been the unrealistic interactions with virtual characters. The same player says that soon after he received a phone call with a prerecorded message saying that the Anim-X office had burned down due to arson, he started receiving messages from "chat bots" on AOL Instant Messenger.[22] "I understand

[22] Available at: http://www.aim.com/. Accessed on: 23 Jan. 2004.

that it would've been very expensive to hire actors to do all the calls and chatting, but the interaction between the player and the characters was very limited," observes Finley *(Id.)*.

A third reason pointed out by Philip Guildford (11 Dec. 2001) was the simplicity of the *gameplay*. He tells that sometimes players were frustrated because they spent hours attempting to complete a difficult task and then found out that the mission had been determined to fail in order to keep everyone in the linear narrative. As a result, the unpredictability necessary to any game was completely removed, making it uninteresting. In a broader context, **Majestic** constrained the player's freedom, because the choices they were offered were very limited.

Moreover, because of the predefined structure of the game, players were not supposed to create new content for it. Creating content for the game is a critical feature of multiplayer and pervasive games. As a result, says Guildford *(Id.),* either the game creators might have been forced to apply more resources to developing the game or constrain the world to a simple linear sequence of episodes. "With just three writers working on the new episodes, the workload must have been overwhelming," he suggests *(Id.)*.

A fourth and the most critical reason, also pointed out by Philip Guildford, for **Majestic's** failure, was its incapacity to create communities: "Pervasive multiplayer games need to be designed so that the *gameplay* pushes players to form such communities by making team working a winning strategy." **Majestic's** player Klint Finley (01 Nov. 2001) indeed tells that he could interact with other players, and add friends to his list of contacts, but that was not different from most online games. Furthermore, the game did not motivate players to share information with other players or work together as a team. "Players were familiar with non-pervasive multiplayer games such as **Quake Arena** and **Counter Strike**, where there is time to consider problems, meet other players and practice as teams, before working together online," says Guildford (11 Dec. 2001). The failure to create communities locks players into the game, not extracting game elements into reality. The non-merging of game and life condemned **Majestic**. Games cannot completely merge with life, otherwise they would not be games, but the exciting thing about pervasive games is exactly the thin border between both. The permanent doubt whether or not it is just a game is the intriguing thing about this type of experience. The uncertainty drives people to play. When it is obvious that it is a game, or when the game structure is not strong enough to challenge players' attention, it becomes uninteresting.

Pervasive games can use multiple interfaces, like faxes, telephones, and e-mail, or a single interface, like a mobile device. While **Majestic** failed because it announced itself to be really complex and could not sustain its marketing, **Botfighters** bet on simplicity. Many developers have been waiting for sophisticated technology to implement pervasive games. However, Swedish company It's Alive showed that a fairly good result can be achieved merely with cell phones equipped with SMS and location awareness. These two features allow important aspects of game playing: communication among players, and the mapping of the territory. The inclusion of text messaging and location awareness to mobile devices allowed players to go out on the streets and use urban spaces as the game environment. The mobile interface also removed the need for a specific place to play the game.

9.3.2. It's Alive: the game is on the streets

When Sven Hålling, a former Ericsson businessman, came to It's Alive, a small entertainment Swedish company, he was determined to "create the greatest game experiences ever seen on mobile phones" (*It's Alive press release,* 10 Feb. 2003). He desired to create games that would "redefine reality" *(Id.).*

The short story told in the beginning of this chapter thus continues:

> After getting caught with his radar guard down, Idren quickly revived his handset and used the radar to determine that his opponent was 9,000 feet away and driving of fast. He was out of range for a wireless bullet, so, hoping to exact revenge, Idren and his girlfriend gave chase. They shadowed Idren's opponent for a full hour at high speeds on the highway but couldn't get close enough to pull the trigger. (Kharif, 02 Jul. 2001)

Botfighters is a pervasive game because it is dynamic, it is simple, and it is always on (unless the player turns the cell phone off, or decides to be unavailable for the game). Moreover, it happens "in between," that is, the player can be doing ordinary activities in life, but she is always vulnerable to a wireless bullet that can come when she least expects it.

Here's how it works: one goes to the game Web site[23] and registers with a nickname. In the Web site the player creates a robot, which is the user's avatar. The player can then arm it with guns and shields and go out on the streets. Soon one starts receiving SMS messages with specific missions to kill other robots in the vicinity. The cell phone is the interface that connects players and creates the game environment. The user can send a "search [bot nickname]" message that informs her of the distance and direction in relation to the other bot. If she is within 200 meters, there is a chance that she might hit the robot (with basic weaponry). "Depending on the weapon your robot is equipped with, you have a different range of attack," explains Hålling (*It's Alive press release,* 15 Mar. 2001). "With the default weapon you basically have to be in the same block as your opponent, but if you upgrade to the Laser Rifle you can be a sniper and hit your target at a distance of almost a mile" *(Id.).* Sending the "shot [bot nickname]" command produces a reply that tells whether or not the shot was successful. Often the user who shoots can get shots back from the attacked robot. The one who has the better equipment (weapons and shields) eventually wins, unless the weakest robot runs away, and is no longer achievable. A successful shot can cause the death or injury of the opposed robot. The winner gets credits in the form of "robuck" with which she can buy armor, radar, and weapons for her bot in the game Web site, making it more powerful. Tom Söderlund (01 Nov. 2002), one of It's Alive's co-founders, explains that shots are more accurate at a close range, "so when two players come within a half kilometer of each other, a chase often ensues."

Even though one can decide to turn the cell phone off or to temporarily be unavailable for searching and shooting, the game is always running in the background. Being able to temporarily disconnect from the game differentiates **Botfighters** from other pervasive games, like **Majestic**. The failure of **Majestic**, according to Sven Hålling, was trying to make the game "too public." "If you are working in an office, you don't want strange faxes coming in for you because of the game. The mobile is a much better device, because you have it always with you," says Hålling (*Apud* Stegers, 08 Feb. 2002). Moreover, **Majestic** had editorial staff scripting new episodes and information for the users. That made the game very expensive to run. Hålling *(Id.)* believes that players in

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[23] Available at: http://www.botfighters.com/welcome/. Accessed on: 17 Dec. 2003.

pervasive games must be able to create content themselves. Like in MUDs, they are the ones who drive the adventure.

According to the pre-research report from the HyperMedia Laboratory in the University of Tampere, Finland, the audiovisual playability does not exist in **Botfighters** (Järvinen; Heliö; Mäyra*, op. cit.,* p. 45). However, why would **Botfighters** need audiovisual playability like traditional PC games? "**Botfighters** is an SMS-based multiplayer real-time game where the real world is the game arena," claims Hålling (*It's Alive press release,* 12 Mar. 2002). Therefore, the game board does not need to be represented[24]; it is the city itself. Still according to Hålling,

> Pervasive games are massively multiplayer role-play games taken to the real world. The game world is overlaid on the real world, using mobile positioning technology to determine players' location. So when you walk down a street, the character representing you in the game is moving too. (Stegers, 08 Feb. 2002)

Like online textual MUDs, **Botfighters** succeeded in removing the map from the game. Thus the key part of a pervasive game is something that many games do not cater to: imagination. "We put the adventure all around you," explains Hålling, but "most of the excitement is in your mind" *(Id.).*

In the Web site, users can arm their robots, see the position of other robots in a dynamic map, and also discuss strategies with other players in the forum. Hålling says that It's Alive learned from Telia[25] that users embraced the Internet-based community aspects, transforming the chat site into a tactics forum where players discussed "how to team up and attack a poor lonely fellow in a park" (*Wireless Reporter,* 21 Feb. 2001). Perhaps the reason for still using the fixed Internet in combination with these games is the underdevelopment of mobile Internet in the present. Perhaps in the future, when the mobile Internet might have more resources, with higher bandwidth and better graphics, the game can be played with only one mobile device. Howard Rheingold (2002, p. 19) observed that **Botfighters** require not only mobile phones, but also other types of nomadic technology devices and transportation technologies. "**Botfighters** (…) requires

[24] In the Web site, as has been mentioned, there is the representation of the game environment, in which players can see each other's positions.
[25] Telia is the Swedish operator who teamed with It's Alive to launch the game.

laptops and mobile telephones as well as cars. While some players were in their offices or apartments, others, like 'the Mob,' moved around Stockholm on foot, subway, and car."

Tom Söderlund (*It's Alive press release,* 21 Nov. 2000) affirms that the community aspect of any game is very important, however, they are even more important in location-based games because there is the possibility of interacting with people who are distant as well as with peers who are in the same neighborhood. Cell phones as interfaces are powerful because they move along with the users, therefore connecting players, and players with the game space. Cell phones offer possibilities, which no other technology can match. "Imagine sitting in a boardroom or classroom, when your phone beeps and delivers a message telling you, your ship is under attack. You know that you're going to stand up and say 'Excuse me. I have to take this…'" says the CEO of Digital Bridges, a UK-based mobile entertainment company.

Botfighters worked because it used simple and existing technology. Instead of waiting for the next generation of mobile phones, with high-speed connection and huge color displays, It's Alive succeeded in creating a game that would be "available for the most of us." The game can be even regarded as a type of "virtual paintball." However, **Botfighters** occur in hybrid space; the shots might be unreal, but the action is indeed real. "The technical solution requires the integration of a Web site, an SMS service and mobile phone location information, which is considerably less complex than the big platforms required by **Majestic**," explains Philip Guildford (11 Dec. 2001). Moreover, the cell phone is no longer just a phone, but rather a "weapon" and a "radar system."

In November 2000, for the trial version, 60 users subscribed to the game. There was no subscription fee, but users had to pay monthly bills for the SMS messages they would send. The game was finally commercially released in the spring 2001. There are a couple of reasons why Sweden developed the first world's location-based mobile game and why people were so excited about it. Sweden is considered the world's most advanced information economy. In 2001, while SMS was still becoming popular in the U.S., Swedish people already typed out text messages as part of their daily lives, like in Finland. Moreover, Sweden, like Finland and other Scandinavian countries, has a very high mobile phone penetration rate: 88.5%.[26] Mobile phones in Sweden, like in Finland,

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[26] Source: ITU (2003). Available at: http://www.itu.int/home/. Accessed on: 17 Dec. 2003.

have been already been studied as community-forming devices. According to Weilenmann and Larsson (In: Brown; Green, 2002, p. 99) who developed a study about the public use of cell phones by teenagers in this country, the borrowing and lending of phones seem natural. Their observations "suggest that the mobile phone is a collaborative resource for teenagers rather than just a personal phone." In the end of 2002, there were 7,000 registered **Botfighters** players in Sweden (Söderlund, 01 Nov. 2002).

Botfighters has also been launched in Finland and in the UK (fall 2001), in Ireland (2002), and recently in Russia (November 2002), where the number of SMS in the first week of the game's launch reached 1 million, according to an It's Alive press release (10 Feb. 2003). In Finland, the game has around 1,000 registered users (Järvinen, Heliö, And Mäyra, *op. cit.,* p. 46), and in the UK 600 people registered already for the trial version. Another interesting fact about **Botfghters** is that the majority of players are between 25 and 35 years old, surprising the game developers who thought that the target audience would range between 15 and 22 years old (Hålling *Apud* Stegers, 08 Feb. 2002). We can suggest, therefore, that the cell phone culture no longer attracts just teenagers.

Although **Botfighters** can be considered a "mere" action game, it changes players' experience of the space in which they live. Bjorn Idren, our car-chase player, tells that because of the game,

> Eventually you start to take trips to places you wouldn't go to otherwise. I found myself sitting on the Web trying to find a nice café in an unknown part of Stockholm so that me and my girlfriend could have a picnic and also destroy a certain bot. (Herald Sun, 23 Jul. 2001)

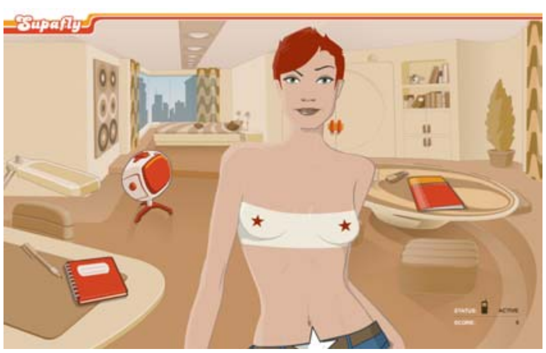
Therefore, the game not only transforms the familiar city space into the strange, but also stimulates users to go and discover unknown places.

Furthermore, some players really incorporate the transformation of physical space into the game arena. "The most enthusiastic players in Sweden followed each other across the city using bikes and cars" (Niiranen, 29 Oct. 2001). There is a taxi driver in Stockholm known by the nickname of "Taxi31" who spends all his time between fares shooting people. He has four phones in his taxi and his bills go up to $4,000 U.S., according to Wired News' journalist Michael Stroud (08 Feb. 2002). "He's crazy," says Hålling, "he even brags on the Web site that he's driven 30 kilometers outside the city to get in battles" *(Id.).* In addition, Tom Söderlund claimed that in the test trials people played the game in ways they would never expect. "One girl sat in front of her PC and used the Web site to locate four targets. Then she jumped in her car and did some mobile 'shooting' with her phone as she drove by them" (Brown, 01 Dec. 2000).

Niklas Stahre, a 24-year old engineer who lives in Stockholm, was among the first enthusiastic game subscribers. He tells,

> What appeals to me about mobile gaming is that you can interact with people while you are on the fly. You can play it whenever you want, wherever you want. You play against real people, and, with **Botfighters**, you have to move around to win an advantage. All of that is pretty exciting. *(Id.)*

In this context, It's Alive takes advantage of the user's mobility in a totally new way. The user has to be moving to be able to play. Pervasive games, like **Botfighters**, strive for taking "the game arena off the PC screen and drape it on top of the real world. So the user is actually walking around in the game world when she is on the street, in school, etc." says Hålling (Devendra, 05 Apr. 2001). Pervasive games are examples of how multiuser games formerly played in virtual spaces can now take place in physical space, taking advantage of the real mobility of users. With the aim to also target the young feminine public, the same company is preparing to launch **Supafly**, the first location-based soap opera. **Supafly** does not have winners *per se*. Players rise up or down in the virtual environment depending on whether their deeds are good or bad. If their actions are cool or evil enough, they get a story written about them in the online newspaper. The ultimate goal of the game is to become famous and to appear on the news.



Pictures 59 and 60: Images from the **Supafly** Web site.

Supafly has been tested in Sweden in the fall of 2002. At the end of 2001, the game prototype was awarded the grand prize "Best Mobile Application" at the First

Ericsson Mobile Application Awards in Zurich. It's Alive won the prize because "**Supafly** is just going beyond the common idea of a mobile game," according to Ericsson (07 Dec. 2001). "They combine comprehensively gaming with community services, location-based add-ons, Web and mobile platforms" *(Id.).*

In order to play **Supafly**, the player also must create a character in the Web site,[27] but instead of arming it with guns and shields, she must give the avatar good clothes and fancy shoes. It's Alive actually made a partnership with real fashion stores, so that if the player decides to virtually "buy" any accessory for her avatar, she can get real discounts at the store. Moreover, users will also pay to become members of the Supafly Club or participate in special competitions. "The game is a combination of multiplayer role-playing game, buddy list, community and dating application, aimed at an age segment of 16-28," explains online magazine Radio-Gamer (11 Dec. 2001). Because it includes many features, the game can also be used without mobile positioning, just to communicate with other users. "Besides chatting, players can also perform one of 30 'actions' with their cell phone's messaging system, ranging from sending someone a 'love gift' to whispering or shouting," explains journalist Michael Stroud (22 Jan. 2003). Moreover, unlike **Botfighters**, users can take advantage of the mobile positioning to really meet friends in the physical environment, instead of only shooting.

With the **Supafly** example, we tend to think that location-based mobile games developed similar to former online multiuser environments. Role-playing games in the Internet started as adventure games, in which players were supposed to win and maybe kill other participants, as shown in chapter 3. Later on, with the creation of Tiny MUDs, they became only social environments, in which users would gather and get to know each other, without the aim to win or to kill. In **Supafly**, like in social MUDs, cooperation is based on a hierarchy of popularity. Conversely, in **Botfighters**, similar to an adventure MUD, cooperation is based on a hierarchy of strength.

Imagining the future, Sven Hålling believes that with 3G networks "there will be different buttons and menus to select your actions, and you might have a radar screen on your cell phone that tells the position of other players," (Stegers, 08 Feb. 2002) but the

[27] Available at: http://www.itsalive.com/supafly/demo. Accessed on: 17 Dec. 2003.

essence of pervasive games will be the same: 24 hours a day, unexpected interventions, and merging with life.

9.4. Games + Art: Blast Theory

Although games have generally being regarded as opposed to and incompatible with art, they have some common points: Both are meant to produce pleasurable experiences, both create a ludic world, and both stimulate the imagination. That's why, following Eugen Fink (1966, p. 76), they would differ from the "serious life." According to Järvinen, Heliö, and Mäyrä (*op. cit.,* p. 25), "there lies a certain enjoyment in the make-belief worlds (whether constructed in forms of fiction, board games or digital environments) that are separated from the rules and tasks of ordinary life." However, although both instances will never coincide, they merge in ways not possible before. Earlier in chapter 4, I mentioned how games could merge with art in virtual environments. Now games merge with art also in hybrid spaces.

Blast Theory is a British group that develops works in conjunction with the Mixed Reality Lab in the University of Nottingham, England. Their work focuses on developing games that happen simultaneously in physical and digital spaces, integrating and forming communities between players who walk on the street and online players. In their games, an action in the physical space might influence a decision in digital space and vice versa. Their first collaboration, **Can You See Me Now?**[28] is like a traditional **Pac-Man** played in hybrid space. Players from anywhere in the world could play online against the members of Blast Theory. According to the project Web site, "Tracked by satellites, Blast Theory's runners appear online next to your player on a map of the city center. On the streets, handheld computers showing the position of online players guide the runners in tracking you down." Street runners are equipped with handheld computers connected wirelessly to the Internet, GPS receivers and walkie-talkies, to communicate to other users. Up to 20 people could be simultaneously online. Online players should run away from street players in order not to be caught. If a street runner caught a virtual player, she

[28] Available at: http://www.blasttheory.co.uk/work_cysmn.html. Accessed on: 26 Jan. 2004.

was supposed to take a picture from the place in which the chase ended, like the one below:

Picture 61: Physical space corresponding to the place where the online player was in the digital simulation in the moment she has been caught.

Street runners would catch an online player if they were within 5 meters of each other. The game has been played on specific days in Sheffield (UK) in 2001, in Rotterdam (Holland) in February 2003, and in Oldenburg (Germany) in July 2003.[29]

Similarly, their most recent collaboration, **Uncle Roy All Around You**[30] sets online players alongside players on the streets of the neighborhood of Westminster, in London. Street players search for Uncle Roy with the aid of handheld computers. On the other hand, online players search for the street players and also for Uncle Roy in a virtual model of the same physical area where the street players are running. Online and street players must work together, and they have 60 minutes to complete the task. Street players can see online players on the map of their handheld computers and online players also see street players in the virtual modeled city. During the gameplay, online and street players can communicate through audio messages and ask each other for help. The game already happened in 2003/2004 in Westminster, Manchester, and West Bromwich (UK). The recent **I Like Frank**[31] is a similar experience that uses 3G phones to connect virtual and physical players in Adelaide, Australia (2004).

[29] **Can You See Me Now?** was nominated for an Interactive Arts BAFTA in 2002 and has won the 2003 Prix Ars Electronica Golden Nica for Interactive Arts.
[30] Available at: http://www.uncleroyallaroundyou.co.uk/. Accessed on: 26 Jan. 2004.
[31] Available at http://www.ilikefrank.com. Accessed on: 17 May 2004.

Blast Theory looks to establish cultural spaces for mobile devices via games. A future version of the game might allow the public to play on the streets using their own cell phones. Similar to pervasive games, **Can You See Me Now?** and **Uncle Roy All Around You** take the fabric of the city and make the players' locations within it central to the game play.

CONCLUSION

The goal of pervasive games is to make games part of life. Eugen Fink (1966, p. 122) and Johan Huizinga (1955, p. 1) proposed the opposite: to play life as a game. Huizinga *(Id.)* argues that “play is older than culture, for culture, however inadequately defined, always presupposes human society, and animals have not waited for man to teach them their playing.” From this point of view, life itself is a pleasurable experience and there is no reason to strictly separate playful and serious experiences. However, no matter in which direction we go, what makes both instances exciting enough is exactly the ability to merge elements from real and imaginary spaces. Although life can be viewed as a game, it needs the playful experience as an offset of the serious part of life. If everything were just serious, or if everything were just play, it would not be stimulating enough. It is precisely the possibility to be able to get out from the ordinary that nourishes imaginary spaces and makes life more interesting. As Pasi Mäenpää and Turo-Kimo Lehtonen (1997, p. 146) describe, the shopping experience is exciting because it allows people to withdraw from the everyday spaces of their serious lives and “travel” to a new, unpredictable, and unexplored space. The experiences of traveling and playing games has the same effect.

Although today’s leisure travel takes the tourist out of her ordinary environment, we focused in chapter 3 on medieval travelers and explorers, because they represented the romantic character of the “real” traveling experience. By real traveling I mean the experience of literally going out of the known physical space and exploring new territories, *mapping space*, and narrating back discoveries and new challenges. Travelers’ narratives about the unknown, when brought back within the known context, enfolded distant and nearby spaces by means of the travelers’ speech—which could be true, but could also be imaginary. Travelers’ narratives about absent and possible spaces, when performed within the actual space, were responsible for creating new types of imaginary spaces.

Likewise, games that emerged from travelers’ narratives and from the mapping of physical space, as we have seen in chapter 3, have represented in a constrained space the projection and creation of imaginary spaces. Games have represented the imaginary exploration of new territories when all the terrestrial physical space had been mapped and, more important, they reproduced the social experience among travelers during the journey. The best examples are RPGs.

During the 1990s the Internet has been regarded as the ultimate space of projection of the imagination. Because the digital network had already been conceptually constructed as an unknown and imaginary space, it seemed that games like RPGs would fit perfectly into the new medium. Thus, Adventure MUDs, and later Social MUDs, arose. However, the Internet user lacked a very important characteristic that belonged to the traveler: the ability to move through physical space. The emergence of nomadic interfaces represents a chance that these imaginary spaces can be again enacted and constructed in physical spaces. Nomadic technologies have a twofold role. First, they allow virtual spaces to be mobile, bringing the imaginary into physical spaces. Second, when used to play games, they free the game from the game board or computer screen, making it possible to use the city space as the game environment.

Nowadays, when the terrestrial physical space has been mostly mapped, the use of nomadic technologies represents the possibility of creating spaces of the imagination even within the known space. We have shown other forms of creating “unknown” and imaginary spaces as folds inside the known space, such as science-fiction stories about nanotechnolgy, in chapter 8, and the shopping experience in chapter 9. However, nomadic technologies enfold distant and nearby spaces by creating an imaginary layer that merges with physical spaces, but not completely. Entirely merging reality and imaginary spaces, or physical space and its “imaginary” representation would accomplish the creation of the 1:1 map, described in chapter 3. Yet as many authors have already stated, the creating of such a map is not possible, for it would destroy the territory—and consequently its representation, together with the fantasy contained in it.

It is the non-coincidence of real and represented spaces that nourishes the imagination. Imaginary spaces have been created by travelers who narrated the unknown, but spoke within the known reality. Games represent an unknown space within the known, and the same is extendable for pervasive games. For imaginary spaces to be created, they must have reference in the known reality, but not quite coincide with it.

Finally, I shall mention the ability of nomadic technology devices to transform physical spaces into multiuser environments. Sociability places, formerly developed in the Internet can now be found in physical spaces. Communities in physical space were formed by people who somehow shared the same contiguous space. Communities in the Internet have been formed independently of the physical location of their members. With the use of nomadic technology devices, it is possible to communicate to people who are both distant and nearby. The emergence of a hybrid space includes features from communities in physical spaces, as well as from cyber-communities, creating a more extensive means of communication. The most obvious way to demonstrate how this type of community can be formed is through games, because games are generally collective experiences. However, we can expand this concept into other aspects of “non-playful” life. Chapter 7 has been partially dedicated to demonstrate how we can view nomadic technologies (in this case, cell phones) as more than mobile telephones, and more than two-way communication devices. Although they are new technologies, cell phones can be powerful collective communication tools in the near future. Even before the expected technological evolution that will include more visual capabilities and higher speed Internet connection, the power of nomadic technologies can already be sensed, because it is intrinsically connected to mobility, i.e, they are digital interfaces that can be carried always together with the user.

This was a story of the passage from multiuser environments as (virtual) spaces to (hybrid) spaces as multiuser environments. I focused on how communication places migrated from the Internet to physical spaces mediated by nomadic technologies, such as cell phones. In defining hybrid spaces as multiuser environments, it has been decisive to envision new possibilities for the mobile interface, considering it as more than just a mobile telephone responsible for two-way communication.

Regarding physical space as a hybrid multiuser environment also implies that mobile technologies transform our experience of space, creating ubiquitous users who are always potentially connected to digital spaces and to absent people. Mobile technologies also allow users to connect in new ways to people who share the same contiguous space. Because nomadic devices create a more dynamic relationship to the Internet, embedding it in everyday activities that happen mostly outdoors, it has also been critical to study why digital spaces have been mostly regarded as instances disconnected from physical spaces. We concluded that material interfaces that mediate our interaction with digital spaces are decisive to construct our perception of such spaces. Nomadic interfaces create a hybrid space that embeds digital spaces and distant contexts into the most basic everyday activities, connecting virtual and physical; conversely, static interfaces like desktop computers and large monitors were also responsible for defining digital spaces as essentially disconnected to physical spaces.

The emergence of nomadic interfaces, however, does not mean that graphic user interfaces (GUI) and simulated spaces will disappear. Rather, mobile interfaces make us aware of the importance of physicality when dealing with digital spaces. Simulation spaces will continue to have important roles in disciplines such as medicine, engineering, and art. Moreover, online multiuser environments will last long, as an alternative form of communication and sociability. Cyberspace, in this sense, is not gone. The emergence of new interfaces does not erase previous ones, especially if their roles do not completely overlap. As the television did not replace radio, also mobile applications, such as games and location-based services, will not replace simulated environments in the Internet, at least in the short run, while cell phones do not have the same graphic capabilities as large monitors, head mounted displays, and projection screens.

However, the awareness that the Internet and the personal computer will stay with us for a while does not mean that the desktop metaphor based on windows is not outdated. As mentioned in chapter 6, the User Interface group at Xerox Palo Alto Research Center looks for new techniques for people to interact with large information environments. Aware that the desktop metaphor is more than 20 years old now, they look for new user interface paradigms to visualize information.

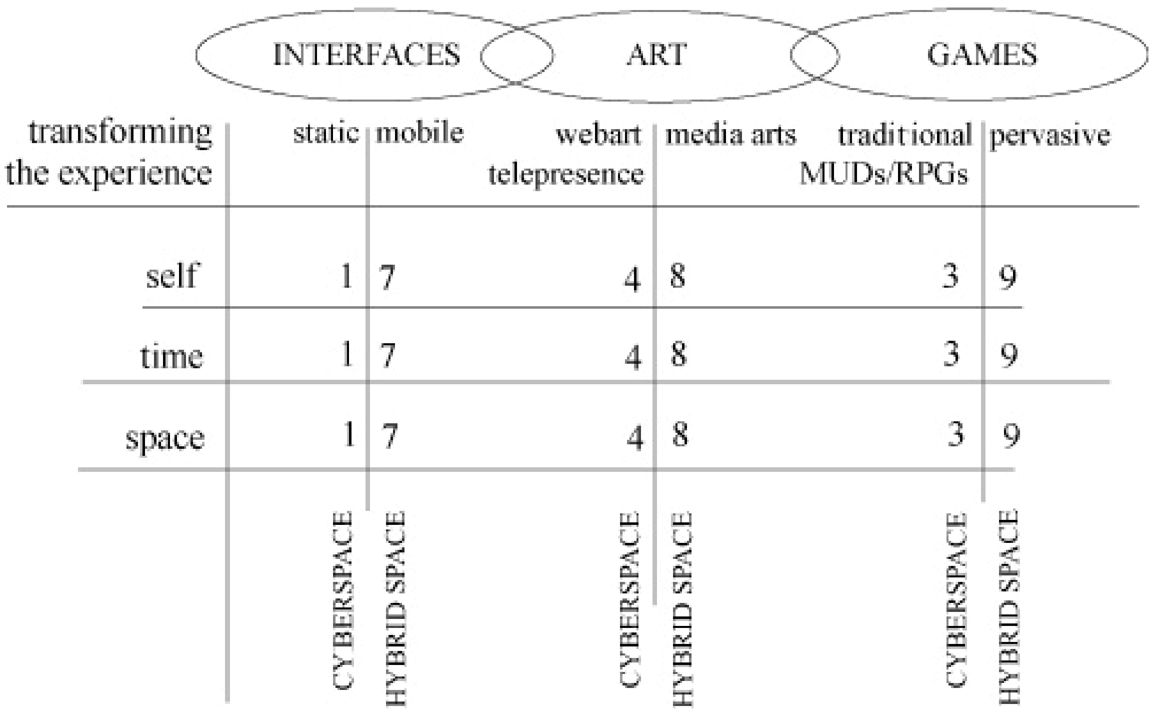
Nevertheless, mobile technology is currently not about visualizing information spaces, but about embedding new information in the physical space in which we live. Because they are part of our everyday experience, they are also called embedded technologies. In this context, we should always question:

- "Where will technology drive us?"
- "Will there be a device that encompasses everything, such as voice communication, data transmission, remote control, and credit card?"

- "Will communication technologies be more ubiquitous and wearable?"
- "How will society deal with the increasing surveillance mechanisms that necessarily develop with ubiquitous and pervasive technologies?"
- "How will our ways of experiencing cities and social communication change due to mobile technologies?"
- "How will society find new meanings for new interfaces?"

I like to think that this work raises more questions than answers. Likewise, it aims at further development of the topics of (media) arts and (pervasive) games related to mobile technologies. However, this exploration will only be possible to accomplish simultaneously with the development of the technologies themselves. As has been noticed, new technologies emerge and the awareness of the meaning of specific interfaces comes later on, simultaneously with the cultural acceptance and absorption of these technologies. The dynamic relationship between cultures and interfaces has been stated in chapter 7, **Cell phones and places**, where I stressed how different cultures deal with the mobile technology. Comparing the way users view the cell phone in Brazil and in the United States to the mobile countries of Finland and Japan might give us a clue on how hybrid spaces will influence our lives some years from now. On the other hand, we should not forget cultural differences that may keep the use of technology in both places always different. It is true that Japanese and Finnish societies are not so much into face-to-face conversation, and that is one of the reasons why cell phones are so popular in these countries. Brazilian and American societies are different. However, we should consider this "inclination to communication" as a positive fact that will help us to find new meanings for the mobile interface, especially when the mobile Internet, the mobile photograph, and location-based services become widely available. As we saw, some type of transformation in the experience of space and time, through micro- and macro-coordination, is already sensed in America.

As generally artistic and playful experiences are the ones that imperceptibly push the limits of technology further, I decided to analyze these changes through art and games. Based on the premise of the Finnish researchers who show that games transform our experience of the self and time (Järvinen; Heliö; Mäyrä, 2002, p. 25-27), I focused on how the experiences of the self, space, and time are transformed by the use of nomadic technology devices (represented by cell phones). Focusing on artworks and games that use nomadic technology devices as interfaces, this work also aimed at connecting art and games bonded by their common characteristics: mobile and pervasive interfaces, the leisure experience, and the power to blur physical and virtual spaces. The table below summarizes the argument:



Picture 62: Book summary.

Experiences related solely to the use of cell phones in transforming our experience of the self, time, and space have been discussed in chapter 7, **Cell phones and places**. Conversely, static interfaces that connected us to cyberspace were studied in chapter 1. Practices connected only to media arts in changing our perception of space, time and the self have been exemplified in chapter 8, **Changing our perception of space**. Conversely, experiences related to Web art and to telepresence art were addressed in chapter 4, where we could already find the seed of hybrid spaces and some attempts to connect art to games. Chapter 3, **Multiuser environments as (virtual) spaces,** focused on identity in role-playing games and MUDs, besides addressing the Internet as a new (utopian) space for the projection of the imagination and annihilation of geographical distances. Chapter 9, besides focusing on how pervasive games change our experience of time and space, was also dedicated to connect games and art. Lastly, the goal was to show how the passage from cyberspace to hybrid space influences and is influenced by the emergence of nomadic technology devices and ludic activities that employ nomadic interfaces. As ludic practices are intrinsically connected to the creation of imaginary spaces, this the redefinition of the relationship between the real and the imaginary promoted by the emergence of hybrid spaces is also addressed.

Some problems and facts that have been identified and that are necessary to define our new hybrid reality are:

- The awareness of the physicality of digital spaces.
- The necessity of redefining the concept of virtual, from simulation to potentiality.
- The emergence of a new meaning for digital spaces and, consequently, for the Internet.
- A new perception of urban spaces which is not visual, but conceptual.
- The reshaping of social relationships.
- The creation of new interconnections among art, mobile technology, and pervasive computing.

Most of these issues have not been raised only by myself, but also by the people who were interviewed in the process of this research. In this context, the goal of this work was to discover how people currently perceive these technologies and experience changes caused by them.

Consequences of changes from the passage from cyber to hybrid are: (1) the blurring of borders between physical and virtual spaces, (2) the redefinition of the concept of the virtual, (3) the redefinition of the concept of physical space (including hybrid environments), and (4) changes in sociability and communication patterns. Finally, I focused on the passage, driven by nomadic technologies, from MUDs as space to space as a MUD, representing that the digital has never been separated from the physical, and it is an essential element for promoting sociability and imagination in urban spaces.

Virtual spaces will no longer be considered disconnected from physical reality.

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