PUBLIC CYBERSPACE

The virtualization of public space in digital city projects

JULIETA V. LEITE AND SÍLVIO M. ZANCHETI
Postgraduate program in Urban Development
Federal University of Pernambuco, Brazil
julietaleite@gmail.com , smz@ceci-br.org

Abstract. Digital cities are characterized by the gathering of people and institutions connected to each other through a computer network, which has a real city as a reference. In this context, it is important to comprehend processes and factors of socialization in communication networks which are routinely present in the dynamics of a city. The aim of this paper is to characterize a concept of Public Cyberspace within the virtualization of public space in selected digital city projects.

1. Introduction

The development of cyberspace, based on digital communication networks, brings a new analytical context to the social relations and the spaces where they happen. Communities are virtually created according to contemporary needs and they spread out through the interfaces of virtual spaces, especially the Internet. The digital city (DC) appears as an alternative in cyberspace that optimizes or completes the organization of the real city. Consequently, the real city finds in the DC a new form of representation and collective participation. The central aim of this article is to verify how public space is conceived in digital city projects. Analogically to the urban space, this paper aims to characterize a structure which can be recognized as a virtual public space within cyberspace architecture.

The role of public space is essential to the present analysis because it constitutes a space for developing social activity. The creation of the digital city from public space is taken as a hypothesis in order to identify and understand the elements and relations that structure, in virtual domains, a space for participation; collective representation the dynamics of which are

related to daily life; and the symbolic appropriations that occur in urban spaces.

2. Computerized communication networks and digital cities

Digital city projects have evolved with the development of computerized networks and cyberspace. In the 1980s, computerized networks grew mainly as a service designed for communication between universities and military areas. In the early 90s, AOL appeared as one of the first providers to offer their clients with internet access from their homes. It was also the first internet provider to register the "digital city" domain, with the aim of making information and services available concerning urban activities in cities of the United States, a situation that still obtains.

Two important digital city prototypes were also created in the 1990s: the Telematic Squares (*Piazze Telematiche* - www.piazzetelematiche.it), in Italy, and the Digital City of Amsterdam (*De Digitale Stad - DDS*). The first model represented a new layer that came to improve the structures of urban space; the second was conceived as a computerized internal communication network committed to a local community development (Francissen and Brants, 1998). However, the Telematic Square project did not expand due to political and financial questions related to urban works in the city of Naples and the DDS lost its strength with the spread of the Internet and the upsurge in sites that offered a more attractive design. In Brazil, in the same period, the University of São Paulo - USP - developed the City of Knowledge (*Cidade do Conhecimento*) project, which integrates with local development initiatives in many regions of the country. On the other hand, most of the Brazilian digital city projects are restricted to examples for electronic government and discussion lists.

The Digital City Kyoto (figure 1) has emerged as a widely developed model, presented in five languages, hosting several virtual communities and was also available in bi- and three-dimensional representations. It was created in 1998 and is the result of a project of the Social Informatics Department of Kyoto University in partnership with other departments, computer companies, computer programmers, students and research workers from many countries. This model was developed with the collaboration of its citizens, based on a report written by the community and institutions. Unfortunately, since October 2001 this model has not been updated. The resources designated to this project had been finished and this digital city was not sustainable by itself.

Figure 1. Site presenting the English version of Digital City Kyoto.
Source:http://www.digitalcity.gr.jp/index-e.html

In this brief overview, two of the main meanings for the concept of Digital City are observed: first, as a new layer of digital infrastructure or an urban tissue that is modified by new habits, in association with a wide range of electronic devices and services (Mitchel, 1995); second, as a fraction of the cyberspace shared on-line by citizens, governments, corporations, institutions and organizations that use the potential of the Internet as a means of communication, expression and negotiation within the different types of electronic services applicable to computerized networks (Mamede, 2005). In this paper, the Digital City is comprehended as a space situated in the cyberspace. So, the experiences of the Telematic Squares are not analyzed in this study since they are associated with changes in the urban space. The experiences of the City of Knowledge, the Digital City Kyoto and the DDS digital city will be further analyzed.

3. Analytical categories

Choosing a clear theoretical approach of reference was crucial in view of the plurality of types and designations for digital cities and the different connotations that the word “public”, which characterizes the object of study, possesses. It should be borne in mind that this study consists of a critical exercise; the concepts of Digital City and Public Space were used as

analytical categories, leading to the construction of a concept of Virtual Public Space.

3.1 DIGITAL CITY

Although the digital city is a new phenomenon, it has been studied by many authors who have tried to systematize the vast universe it covers, based on different approaches and methodologies. The notion of Digital City adopted in this article is the one expressed by Zancheti (2003), who defines it as a "system of people and institutions connected by an infrastructure of digital communication (the Internet) that has a real city as a reference". According to him, the DC should present one or some of the following purposes: to create a space for manifestation and cultural expression between individuals and groups; to create a communication channel between individuals and groups; to build communication and negotiation channels between the city government and its citizens; to promote the identification of the inhabitants and visitors with reference to the city; to create a database with varied and easily accessible information about the city.

There are two different ways to represent the digital city within Zancheti´s concept: the analogical and the symbolic. The first case is characterized by elements and symbols that foster the promotion of urban activities in the real city. They are representations of a real city, reproduced in digital cities, which reinforce and extend the communities that already exist. In the second case, digital cities reproduce urban structures by using the names or images of buildings, squares and houses. They use the metaphor of a city in the site architecture but this does not correspond to a territorially defined city.

3.2 PUBLIC SPACE

The concept of Public Space adopted refers to two interdependent processes that occur simultaneously in its definition with regard to the city: the social construction of space and the spatial construction of public sociability (Leite, 2004).The Public Space is a space created by social practices that attribute different meanings to it, define its physical and symbolic boundaries and give the notion of belonging to this space. Carrion (2004) presents a concept which comprises these two processes: "the public space is developed as a component of collective life organization (integration, structuring) and representation of society (cultural, political), where the social activity occurs, which occupies different positions depending on the surrounding context, the given reality and the user group to which it is designed".

Consequently, according to Carrión, Public Space has two main functions within the city: firstly, it gives meaning and shape to collective life by

enabling the citizens to see the city and live collectively. It is made up of spaces of representation and social recognition, where the history and culture of the community develop and become known and remembered. In this space people regard each other and are regarded as politically engaged citizens according to norms of social solidarity. Secondly, it represents collectivity, by creating spaces where society becomes possible and where the expression of the social identification of diversity is built. Such representation is continuous in time and space, through the symbolic appropriation of the public space and the symbolic appropriation of elements that identify it. In this sense, public space is closely related to the concept of urban memory.

3.3 VIRTUAL PUBLIC SPACE

Based on the concepts of the Digital City and Public Space presented, a preliminary conception of Virtual Public Space was created as a hypothesis to be verified. This hypothesis was useful for elaborating the criteria of analysis for digital cities and also helped in creating a final notion of Public Cyberspace.

Virtual Public Space is defined as a space structured by digital communication networks that serve the two functions of organizing and representing a collectivity at one and the same time, since they refer to a real city. It should present at least three of the following five purposes: to create a communication channel between individuals and groups; to build communication and negotiation channels between the city government and its citizens; to create a guide with varied and easily accessible information about the city; to map and integrate levels of information and services of the reference city; to offer a suitable environment for exchanging information, goods and services.

4. Methodology

This study was conducted using the following procedures: definition of the analysis criteria, the collection and analysis of cases, comparative study of the cases chosen. The analysis criteria were based on the functions and purposes drawn up in the hypothesis for Virtual Public Space presented in the analytical categories. The cases were analyzed by identifying specific characteristics that were related to the accomplishment of the required purposes in each example. The group of characteristics was arranged in a synthesis matrix, which enabled the measurement of the criteria defined by the given hypothesis and enabled a definition for Virtual Public Space.

4.1 RESEARCH SAMPLE

The first sampling of cases was suggested by searching for the expression 'digital city' on search engines. Seven cases were chosen as being the best known, with the most number of users: the *AOL City Guide* (www.cityguide.aol.com), *Geocities* (www.geocities.yahoo.com) and the digital cities of *Kyoto* (www.digitalcity.gr.jp), *DDS* Amsterdam (www.dds.nl), *Bologna* (www.iperbole.bo.it), *L*inz (www.linz.at) and *Aveiro* (http://digipraca.aveiro-digital.net). After that, five cases were chosen according to criteria set by the authors (see the following paragraph): *Terra Cities Guide* (http://cidades.terra.com.br/), *Orkut* (www.orkut.com), *Cidade do Conhecimento* (City of Knowledge - cidade.usp.br/), the *Infovilles* (www.infos-villes.com) and the *Porto Digital* project (Digital Port – www.portodigital.org).

The *Terra Cities Guide*, similar to *AOL Digital City*, was chosen because it was one of the first projects to provide an Internet service for locating entertainment and services in Brazilian cities. The *Infovilles* project was chosen because of its concept of linking up cities for local development. A similar concept underpins the *City of Knowledge*, which was selected as a representative case for Brazil. The *Porto Digital* project was chosen as it is a local experience in the city of Recife, Brazil. Finally, *Orkut* was analyzed because it forms the largest virtual community over the period covered by this empirical analysis, 2004-2006, and includes a large number of Brazilian users, besides including communities about real cities. At the end of the empirical analysis this example pointed many different characteristics within the group selected and it was excluded from the synthesis tables. Although it presented a great number of users, this case could not be characterized as a virtual public space.

Currently, the *Second Life* (SL) virtual game possesses the biggest virtual community on the Internet, with about two million users and approximately three thousand five hundred constant players (http://secondlife.com/). However, the SL communities share a single universe with no demarcation of territories; therefore it would not correspond to the meaning of digital city expressed in this paper.

This group of 12 cases forms a significant and varied sample of digital cities, represented in Table 1, within the two types of DCs mentioned, in accordance with how they relate to the urban space: the symbolic, under a common nomenclature, as an urban metaphor; and the analogical, for which the digital city project is related to the residents, institutions and physical space of a given city. *Terra Cities*, *AOL Digital City* and *Geocities* are examples of symbolic digital cities related to major internet providers. *Geocities* was unique as it presents the largest community of personal websites on the Internet.

TABLE 1. Sample of cases classified according to Zancheti.

Digital City			
Type	**Symbolic**	**Analogical**	
		(Group of cities)	*(Single cities)*
Cases	Terra Cities Guide; AOL City Guide; Geocities; Orkut.	Infovilles; City of Knowledge.	Kyoto; Linz; DDS; Bologna; Aveiro Porto Digital.

The *Infoville* and the *City of Knowledge* projects also congregate different cities, but these cases are less committed to the promotion of tourism and entertainment. They constitute projects of local development through a consortium of cities, which consider the characteristics of each place. The *Porto Digital* sets out to provide local development by having designed a district of the city for the location of Information Technology companies, and thus is configured as a smaller system and less open to a diversity of users.

The digital cities of *Amsterdam* (DDS), *Aveiro, Bologna, Kyoto* and *Linz* comprise another group of digital cities which are related to a specific location or community. Kyoto appears as a digital city model with a social infrastructure of information. The *DDS*, when it started – a period that makes it a significant example for this study - proposed a digital representation with collective engagement. The digital cities of *Bologna* and *Linz* group different types of information about the city, for tourists and citizens. The digital city of *Aveiro* is a community project that aims to mobilize society in order to achieve goals originating from the community itself.

4.2 ANALYSIS OF CASES

The analysis of cases set out to identify whether the two essential functions of Public Space succeeded in organizing collective life and representing the collectivity, according to the purposes that characterise Public Cyberspace (see item 3.3). It is important to emphasize that the accomplishment of one single purpose is not sufficient for identifying a public virtual space, since it must fulfil both functions. This condition is part of the concept of public space already presented and it is only achieved by reaching a group of purposes, used as analytical criteria, that characterises the analytical criteria used in the analysis of cases, shown in Table 2. An assessment was made based on each of these five specific criteria. During the empirical analysis, specific characteristics were found for each DC according to the five criteria. Next, each purpose is defined in detail and related to both functions that characterize public space.

TABLE 2. Analytical criteria used in the analysis of Virtual Public Space.

Functions of the Public Space	**Purposes of the Virtual Public Space (Criteria)**
I. Contributes to organizing collective life.	1. Create a communication channel between people and groups. 2. Create negotiation and communication channels between the citizens and the government.
II. Enables the representation of the collectivity.	3. Create a guide with varied and easily accessible information about the city. 4. Map and integrate different levels of information and services. 5. Ensure a suitable environment for exchanging information, goods and services.

4.2.1. Creating a Communication Channel between People and Groups
This criterion identifies the structures of digital cities that make it possible for the citizen to exist in cyberspace by offering a communication channel such as e-mail, chat rooms, and the creation and maintenance of personal homepages. When generating and maintaining a user identity on the Internet, such structures help to promote the creation of diversified networks and increase the number of relationships (either strong or weak ones) between geographically distant users as well as neighbours and relatives (Wellman at al, 2000; Castells, 2003). As a result, they stimulate the community to seek engagement, as it is a structure that represents collectivity.

4.2.2. Creating Negotiation and Communication Channels between the Citizens and the City Government
This criterion corresponds to the existence of a structure that allows social participation in discussions concerning the city (deliberation), the evaluation of results and budgets (consultation), as well as manifestation and debate on issues of public interest. Therefore, it indicates the DC's potential for recognizing its citizens, communities and institutions as well as recognizing how each of these forms of representation takes part in the process of management, planning and promotion of local development. Briefly, this criterion stands for the creation of a public space of mobilization, which is more about policy forming than promoting cultural activities/ knowledge.

4.2.3. Creating a Database with easily Accessible Information about the City
This criterion contributes to the identification and cultural representation of a group, through the broadcast of symbols and values of various social groups, in space and time. The appropriation of these elements and their

reproduction allow the spread and perception of signs, meanings and imaginaries of those communities and their spaces. It refers to a structure that supports and legitimates the relations and bonds between communities, which contribute to the preservation of the local heritage.

4.2.4. Mapping and Integrating Different Levels of Information and Services
Mapping information and services in the urban space reinforces the notion of collectivity by representing a space as a collective construction. With regard to territorial information, it is important to make available an interactive cartographic base containing and cross-referencing information about the infrastructure, the use and occupation of the space, for instance, rather than just localizing addresses or services within the city. Thus, multiple readings of the city are provided, according to the area analyzed or the type of information sought. Representing the real spaces in digital cities is relevant for recognizing and validating both spaces.

4.2.5. Ensuring a Safe Environment for the Exchange of Goods and Services
This criterion is closely related to an environment of commercial exchanges or offers of services, presenting a structure that focus on the circulation of products, equipment, goods, as well as information, the content of which may be useful for the users' higher education or acquisition of skills. It represents daily activities when referring to important exchanges carried out by sharing information, values, signs and meanings.

Three main characteristics were found for each criterion within the group of cases analyzed. Therefore fifteen characteristics were identified as being the most relevant ones, represented in Table 3 (see the following page). These sets of characteristics were arranged in a synthesis matrix (Table 4, page 11), where each DC received a score for each characteristic (from the group of fifteen mentioned) observed. The comparison between the final scores (Table 4) resulted in identifying the case that would best suit the attributes of a virtual public space. There follows a presentation of the synthesis matrix and its results.

TABLE 3. Purposes and main characteristics of the Public Cyberspace.

1. To create a communication channel between people and groups.
- Allowing the creation of identity for users in the Internet.
- Promoting the formation of diversified networks.
- Increasing or reinforcing local relationships.
2. To create negotiation and communication channels between the city hall and the citizens.

- Offering a space for manifestation and debate about the city.
- Presenting public services or public documents on-line.
- Allowing citizens to inform decision-making on urban planning.

3. To create a database with easily accessible information about the city.
- Providing information on urban services for citizens.
- Providing information on tourism and leisure activities.
- Providing a database of the local culture and environment.

4. To map and integrate different levels of information and services.
- Locating people, addresses and services in the city.
- Enabling virtual sightseeing (by 3D models, photographs and videos).
- Offering an interactive cartographic data base.

5. To ensure a safe environment for the exchange of goods and services.
- Offering an environment for commercial exchanges and services.
- Promoting e-learning and jobs via the Internet.
- Giving support and security to financial negotiations.

5. Analysis of results

The values obtained in Table 4 (see following page) reveal that the symbolic digital cities were less able to offer virtual public spaces, although they accomplished the criterion of engendering a communication channel. Such are the cases of *Terra Cities Guide* (score = 11), *Digital City* (score = 13) and *Geocities* (score = 14). On the other hand, the example of Kyoto was the most complete and well-defined project in terms of characterization of a virtual public space, because it presented the largest number of characteristics (score = 36), being the maximum score possible and the one that best accomplished both essential functions for defining a public space within the digital city.

The digital cities defined as symbolic (such as *GeoCities*) stood out from the others in the function of representing the collectivity, particularly within the criterion of 'creating a communication channel between people and groups, because they enabled individuals to represent themselves in cyberspace through structures that generate and store homepages of individuals, companies and other different associations. In fact, this criterion was present in most cases.

TABLE 4.Accomplishment of Public Space functions in the DCs analyzed.

Analytical criteria		**Digital Cities analysed**										
Functions	**Purposes**	Terra	Digital City	Geo Cities	Porto Digital	Linz	DDS	City of Knowledge	Aveiro	Iperbole	Info Villes	Kyoto
Collective Organization	1. Communication	1	1	2	2	0	3	3	3	3	3	3
	2. Negotiation	0	0	0	1	1	2	3	3	3	3	3
	Subtotal (*weight 3*)	**3**	**3**	**6**	**9**	**3**	**15**	**18**	**18**	**18**	**18**	**18**
Representation of collectivity	3. Information	2	2	2	1	3	2	3	2	3	3	3
	4. Location	1	1	1	1	2	2	0	2	3	2	3
	5. Exchanges	1	2	1	2	2	1	2	2	1	3	3
	Subtotal (*weight 2*)	**8**	**10**	**8**	**8**	**14**	**10**	**10**	**12**	**14**	**16**	**18**
	TOTAL[1]	**11**	**13**	**14**	**17**	**17**	**25**	**28**	**30**	**32**	**34**	**36**

The examples referring to a community located in urban space showed a greater involvement of users, especially concerning the creation of public spaces for debate. This was observed in *Kyoto* and in the digital cities of *Linz* (score = 17), *Amsterdam* (score = 25), *Aveiro* (score = 30), *Digital Iperbole* (score = 34) and the *Infovilles* cities (score = 34). These cases contributed to the definition of a participative public virtual space, which represented the cultural values of the communities.

Whereas the city of *Linz* (figure 2) did well in accomplishing the requirement to 'represent the collectivity', especially concerning its cultural aspects, it did not show the same performance for the other essential function of the public space, for it presented the proportion 3:14, regarding the functions of organizing the collective life (score = 3) and representing the collectivity (score = 14). It means that this case is less able to offer a public cyberspace. The *Porto Digital* (Digital Harbor), although designed for

[1] In order to obtain the same proportion between the two functions of the public space, weights were assigned to the scores. As the first function was defined by two purposes (maximum of 6 characteristics observed) and the second one by three (max. of 9 characteristics), the results obtained analysing the first function have a weight of 3 and the second function a weight of 2.

a geographically located community, restricts public participation to the target group of information technology companies, thus becoming a weak example of a public space (score = 17).

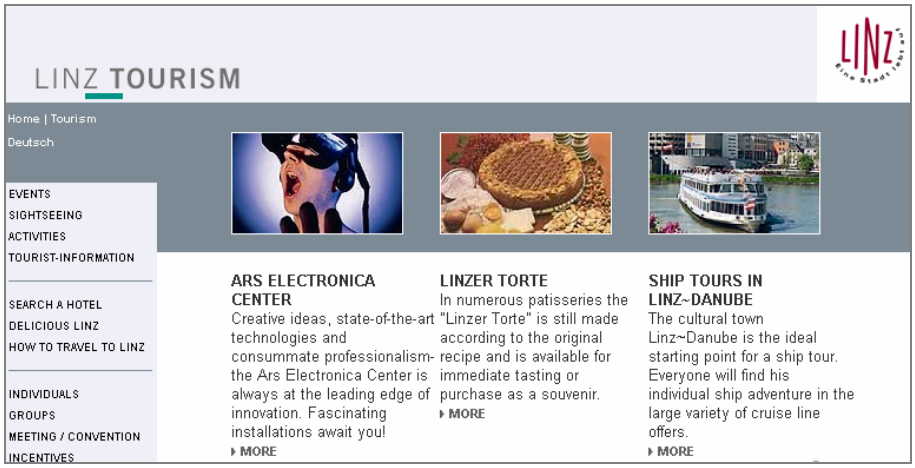

Figure 2. Site of Linz digital city - English version. Source: http://www.linz.at/

Physical representations through maps, 3D models and Virtual Reality were very recurrent, whereas their application to cultural monuments was barely observed, although this is an important means of cataloguing the artistic and historical heritage. *Bologna* (figure 3 in the following page) was a successful case where the mapping of the historical heritage was presented in virtual reality with a chronological classification and explanatory texts. *Kyoto* catalogued several aspects of local and environmental culture, through texts and photographs of gastronomy, festivities, celebrations, customs, songs etc.

The DCs aim for greater credibility by establishing a close relation with communities, institutions and urban territories. The physical reality of these places serves as a structure that supports cyberspace and community projects, thus providing communication networks with more reliable information and exchanges. It is worth mentioning that, within the group of cases analyzed, the construction of a virtual public space depended on creating representational structures of the city in its physical and cultural aspects, and also depended on the citizens' involvement.

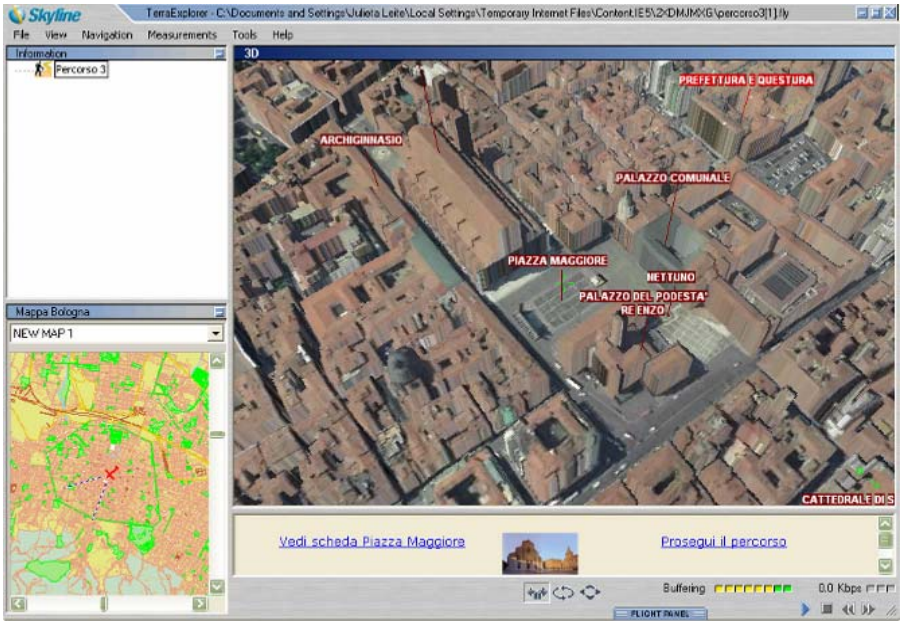

Figure3. Virtual overview of Bologna. Source: http://www.iperbole.bo.it/. April, 2005

6. Conclusions

Based on the descriptions of the analytical categories and on the conceptual hypothesis mentioned, we developed a final characterization of Virtual Public Space, expressed as a selected group of digital cities and completed by empirical analysis.

Virtual Public Space is comprehended as a space where individuals recognize each other and are recognized as a group, according to bonds of social engagements, civic participation, involvement in policy formation and cultural expression. It groups individuals, associations and the administration of a real territory under an infrastructure of digital communication, while accomplishing the functions of organizing collective life and representing collectivity. It may present several purposes, such as, creating communication channels between people and groups, creating negotiation and communication channels between the city administration and citizens, creating a guide with varied and easily accessible information, and ensuring a suitable environment for exchanging information, goods and services.

The growth of Virtual Public Space occurs in accordance with two main activities: information and interaction. These activities are observed in people's daily lives, through networks of information and sociability, in the diffusion of services and information, political activism, community recognition and also in the users' modes of expression, mobilization and

discussions. Furthermore, virtual public spaces offer a setting for local networks to share a collective memory, to strengthen their social bonds, to consolidate and transmit new values as well as political and cultural codes.

The development of structures that represent virtual heritage in cyberspace plays an important role in the reproduction of local customs, values and knowledge. With regard to values, digital representation improves their means of reproduction and transmission, as was observed in the Digital Iperbole and Digital City Kyoto projects. Therefore, this leads to increasing the possibility for different communities to share specific and distinct cultural values. Simulation processes (Virtual Reality) allow for extending comprehension, interpretation and interactivity with the created heritage. The portals of digital cities have also shown a potential for organizing social movements, local networks and non-governmental organizations. In addition, the networks of social representation allow different types of social systems to be reached and allow them greater participation in city management.

However, some challenges within the construction of Virtual Public Space were observed at the time this research was conducted (between 2004 and 2006), particularly concerning resources for representation and issues of usability. These problems often affected the interaction between users, the ability to transmit information and revealed some difficulties as to public participation in everyday life. Currently, the evolution of the Internet has brought new solutions that extend the relations between the user and virtual spaces by means of collaborative information systems and new social networking services. The production of informative contents on the Internet has become easier and more generalised for the ordinary user. Collaborative creation applied to Internet-based cartography systems, such as Google Earth, allow the representation and mapping of solutions not only for address research but also for tagging and adding information by users. Today's most widely-known system of information collaborative creation on the Internet is the encyclopaedia Wikipédia.

Social network services such as *YouTube*, *MySpace*, *Facebook* and we can also cite *Orkut* - for give some examples of famous websites - are also spaces for collaborative creation and interest or experience which share by diverse ways of interaction, such as chat, messaging, video, voice, file sharing, blogging and discussion groups. With podcasting, a service for audio and video sharing, these new typologies of virtual spaces characterise another public space, different from Digital Cities. As public spaces, these cases serve to promote interaction (Nieckarz, 2005) by maintaining virtual communities and a role of varied social relations that include physical and virtual ones.

Finally, there is an aspect that deserves particular attention. This concerns the important role of the public sector in ensuring and regulating the public sphere, even although it refers to cyberspace, with regard to private sector interests in economic issues and values. Just as occurs in physical space, virtual public space demands maintenance and resources. Within the universe of cases analyzed, the ones that best met the requirements for a public space were connected to a local government; nonetheless, they did not appear indifferent to commercial interests. In fact, internet business happens wherever there are people online (Castells, 2003). It is interesting to verify the purposes of the digital cities, which give pride of place to the space of non-commercial culture and social interaction instead of publicity, advertising and commercial exchanges.

Acknowledgements

I would like to thank the CAPES Foundation - Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - for the financial support provided to this research.

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