
Contextual design research towards a new relationship among space, people and technology in a smart city

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Abstract

Starting from the difference between “place” and “space”, we propose to define the concept of hybrid space for characterizing a place in which people and technologies cohabit in a synergic way. Having this goal in mind and aiming at sustainable mobility, we focused on biking as a way of living urban spaces and we interviewed a group of people with the aim of discovering the relations between these notions. After analyzing the results of the interviews, we propose to adopt a critical design approach to encourage the reflection about the perceptions of place and space from users to define the concept of hybrid space as a pleasure place in which people live and with they build an affective relation.

Author Keywords

Urban Informatics, Smart City, Hybrid Space, Interaction Design.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

The hybrid city is a place in which information technologies, physical and digital infrastructures and citizens cohabit. Hybrid cities as spatial interfaces are

able to support and improve the day to day experiences of citizen, using virtual and physical spatial elements and information to provide a more complex stream of communication and exchange between people, technology and space[1]. People who live in hybrid space become hybrid citizens because they are the 'owners' of this comfort zone in which all components are able to communicate, share, experience. In our idea, designing for a hybrid city represents a challenge to make a city smart, focusing the attention in reorganizing it from the point of view of the structure and services to make it closer to its citizens. We are convinced to go towards the creation of a city shaped on its "users", a city perceived by its inhabitants as a place that enables and encourages sustainable behaviors and provides effective answers to their needs thank to the use of Information and Communication Technologies.

For these reasons we started from a "human" point of view. According to a long tradition of anthropological and sociological studies [6], we believe that there is a strong bond between space and people [3]. These natural and spontaneous links are very important in the social engagement in the urban space. In our research project, we decided to investigate these relations with the aim to raise the engagement and stimulate people to understand and take care of urban spaces. The nature of the problem suggests the adoption of methodologies typically used in interaction design (ID) and HCI projects. Using an ID approach, the first step consists in better defining the problem and the situation we would like to investigate. We decided to focus on urban spaces and sustainable mobility, encouraging the use of bicycles through the re-contextualization and innovation of the experience of cycling citizens.

Taking inspiration from Carlo Ratti SENSEable City Laboratory at Media Lab [7], we intend to focus on a renewed culture of cyclists to enhance the experience and renew the attention of the persons to take care of urban spaces.

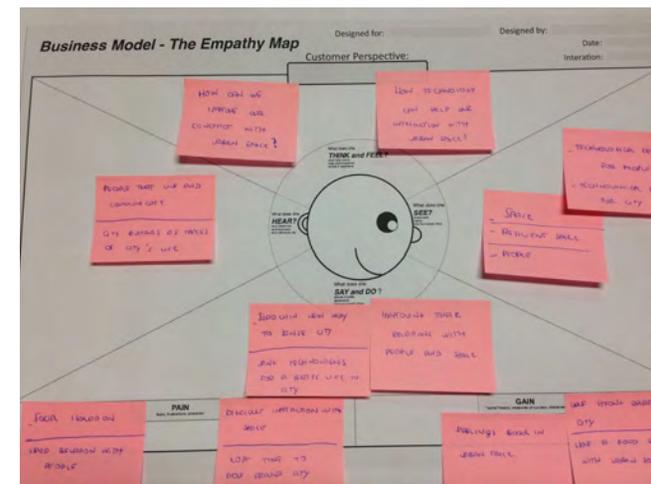


Figure 1. Empathy Map

Our experiment

We adopted a qualitative approach in developing our design research with the main scope of defining hybrid space according to human perceptions and feelings. The investigation was carried on by interviews to better understand the relationship between people and urban spaces and then obtain more detailed information on what they observe, what they think and feel when they move around city riding a bicycle, as is showed in Figure 1. These kinds of considerations are supported by the adoption of Empathy Map [12], a tool from business field

for a deeper understanding of citizens as final users. It represents a top down approach to discover unexpected insights and to have better comprehension of users' needs.

Having done the Empathy Map exercise, we identify some specific themes that emerge: we intend to immerse ourselves in a user's environment following a bottom up approach, to find the better experience for them in the urban landscape. From these suggestions, we can be flowed into a Persona and then we are able to define our sample group to address our research studies.

The aim of the investigation was to speculate the deeper perception that people have of urban spaces and to understand their perspective in the connection with them. We also investigate the opportunity of introducing some technological device to mediate and improve the relation with the spaces and to encourage the reflection about this relation.

Use Users	Day to day	Occasional	Sport
Owner	8	2	2
Sharing Users	2	2	2

Table 1. Cluster selected for interviews.

For a better comprehension of these themes, we selected semi-structured contextual interviews as a design method, because they are more flexible and favor the emergence of key issues. Thereby, the semi-structured contextual interviews appeared as the best method to encourage the natural flow of discussion yet focusing only on the issues that that were interesting for our experiment. We involved

16 cyclist clustered in two different groups as showed in Table 1: bike-sharing cyclists and bike owners.

We considered users with different approaches to biking and possibly different points of view in the relations with urban spaces. We also decided to meet users open to the adoption of technologies, to gather feedback about the pros and cons in using technological devices to interact with the city.

During the interview, we asked people about their idea of biking, what their relation with it is, their considerations about the use of ICT, which type of technology they were adopting interacting with urban space. Additionally, we investigated the nature of the relationship between people and the environment, their attention to ecology, pollution, etc. The data derived from this research activity were then analyzed and processed using an affinity diagram[4], a design instrument for collecting large amounts of data and for organizing them according to their affinities, as showed in Figure 2.



Figure 2. Affinity Diagram

The results

Analyzing data, we identified the emerging of two different insights. First, interviewees told about various scenarios of emerging needs, usage and perceptions about the adoption of bicycle. *'Bicycle is my favorite hobby. Starting as urban cyclist, I became a professional user. I choose bicycle for all my travels in the city. I identify myself in cyclist categories, using bicycle you embrace a special lifestyle'.*

Second, the main interesting insight is about the perception of time and space in which user moves: *'The bike is freedom. I got in touch with many people while riding my bike. I define the speed of my trip: this allows me to focus attention on specific and peculiar details of the landscape, it allows me to pause my journey and finally it encourages me to look about and around and enter in contact from inside to outside'.*

All subjects told about themselves, shifting the focus of interview on their personal history with particular attention to their experience of space and time on bicycle. They described the bicycle as an 'unarmored' means of transport, they did not feel isolated on a bike as it happens in the car that is defined as a *'case that protects and expels the individual's perception of sounds and deprives him of the contact with the outside'.* Users stated that while on a bike they experience a new way of getting in touch with the surrounding environment. In addition, they said that biking made them aware of their body, allowing them to hear their body and feel strain and sweat. Finally, the bike appears as a first and primordial "symbiotic device" with which to clothes, experience and test themselves, and to experience motion and speed. *"The bike gives you the chance to stop and find a different time, your time. There is a more direct contact with the*

buildings, the environment, the landscape, and most important a contact with people. "

We propose to choose body as a new way to connect people [13] and we choose wearable technologies as a first step for improving the users' experience in urban spaces, focusing on their body.

Conclusion and future works

Taking inspiration from the concept of "SENSEable city", we intend go beyond the perceptions of space and encourage the vision of the city as an interface to gather information, to meet people and share experiences with them [8].

The insights suggest that hybrid space is a sort of place where human beings give an affective value to urban spaces. Our idea is to focus on the feelings, affections and moods as the missing features able to define and to transform a space in a hybrid space [2]. With our study we would like to demonstrate that these features could be made stronger firstly by the use of technological devices as mediators, bicycles in this situation, in perceiving people and spaces secondly exploiting the capabilities offered by human body. It would allow tracing the relation between space, human beings and artifacts in a natural way and would support the creation of a sort of 'emotional cartography'[9]. Taking inspiration from the importance that wearable computing and wearable technology had taken in the last years, we try to go beyond these artifacts and focus on the human body as the innovative interface through which people are able to communicate with surrounding environment, exchanging information from a large variety of personal devices.

Human body can be exploited as a 'framer of information'[14] because only through it, users can transmit and receive information, control and record

them. Also they become able to store personal information such as biophysical parameters, contextual information, and so on. As holder of their stored personal information, they are able to decide what they want and what they do not want to know about the context around them. The body becomes a controller of personal information.

In our vision, the body is exploited as a new way to experience the reality but, at the same time, it also represents the way to show and to visualize information about itself.

We conceptualize 'bodily interaction' following Norman's works[15], where he introduced the metaphor of the symbiont, imagining a deeper combination between a person and a machine.

If we compare Norman's idea with our proposal, we perceive bicycle as a new body: through the bicycle people can experience themselves without interrupting their symbiosis with bicycles themselves – and, thus, their cycling.

Urban informatics points out the existence of a 'sentience' of the city[10], that refers "to the ability to feel or perceive subjectively, and does not necessarily include the faculty of self-awareness". In conclusion, we claim that emotions, thoughts, affects represent the bridge to link hybrid space and hybrid citizen. Through these components, we are able to go beyond the current concept of smart city and to open the mind to a more complex realm such as hybrid space to be designed.

In order to stimulate the reflections about hybrid spaces and the use of technological devices and to support the construction of a deeper relation between people and these spaces, we will adopt a critical design method to shift the attention from technologies to body as a new interactive device [11][22].

First, wearable devices represent a way to go beyond mobile phones, focusing on the usage of the body as a new, unique way to interact with the environment[19]; wearable computers make the distinction between an 'inside space' and an 'outside space' where people move unclear.

Moreover, according to Sheller suggestions[17], focusing on the human body, it can represent a relevant entity in the space. It becomes a node of a micro-network society where time and space have unclear, fluid and weak coordinates[18].

We are convinced that applying a critical design approach and that stressing and exploiting human body as a new interactive device to get in contact with surrounding environment, we would be able to stimulate a creative sensibility[20] in human beings to perceive their relation not only with space but also with one other.

The main goal will be supporting the emergence of critical attitude in the users[21] to define a hybrid space where the presence of the body is functional to draft not only a connection between people and space, but a bridge between people and people that are moving in the same hybrid space.

Our pilot study was useful to understand and define the existing relation between people and space, how a mediator such as a bicycle can support and improve it, and to define that in order to obtain a full hybridization we will have to start from a complete fusion between people, technologies and spaces, working to make technologies and artifacts invisible and completely embedded in surrounding space and to support human body itself as the only element interacting with the environment.

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